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ABSTRACT

Presented are guidelines for planning science programs for the educable mentally retarded at four levels of difficulty: primary, intermediate, junior high, and senior high school levels. Areas of study covered at each level are animals, plants, weather and seasons, the earth, the universe, forces, human beings, and the environment. General objectives, an outline of content, resource materials, suggested experiments, initiatory and assimilating activities, and selected starter units are included. Evaluation sheets are also included. (KW)

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A GUIDE FOR TEACHING THE HANDICAPPED

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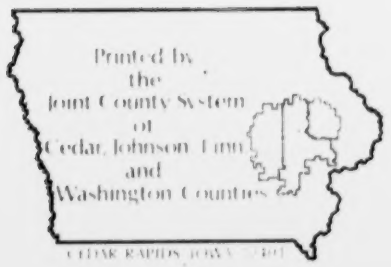

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November, 1970

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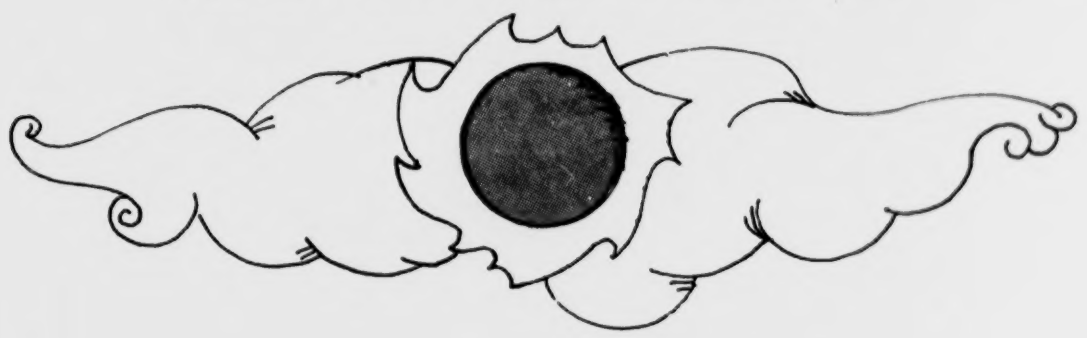

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Special Education Curriculum Development Center -- an in-service training project

The Special Education Curriculum Development Center has as its main objective the operation of a statewide in-service training program for teachers of the mentally retarded. Twenty special class teachers from different geographic areas of Iowa serve as consulting teachers. They attend training sessions at The University of Iowa and then return to their home area to conduct field sessions. All materials prepared for SECDC are intended for dissemination through the field sessions conducted by the consulting teachers. Persons reading SECDC material but not attending the field sessions should keep in mind that the purpose of the material is to serve as a starting point for in-service training and that the publications themselves are not end products.

It should also be noted that any reference to commercially prepared materials by the Special Education Curriculum Development Center does not constitute a recommendation or endorsement for purchase. The consideration of such material is intended solely as a means of assisting teachers and administrators in the evaluation of materials.

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INTRODUCTION

The lack of emphasis in teaching science to students enrolled in special classes for the educable mentally retarded becomes apparent as one reviews published curriculum guides and observes special class instruction. Why this situation exists is open to speculation. Possibly one of the major reasons is that the subject of science has come to be identified as an academic area of study much beyond the capabilities of the mentally retarded. If this were the only factor involved, the problem could be resolved merely by illustrating to teachers the many simplified scientific concepts of crucial importance in our daily lives and by pointing out the almost limitless opportunities related to science. However, as the problem was discussed among the SECDC staff members and resource persons it became evident that probably the teacher's lack of preparation in the area of science and the paucity of available guidelines for planning science programs for the educable mentally retarded were also significant contributors to the dilemma.

Science need not be taught as a series of lessons on specific concepts. A functional approach to the teaching of science should emphasize instruction on concepts which directly relate to the students' daily experience. In many cases this means teaching science concepts as a part of units on homemaking, occupations, health, and safety, to mention a few examples. In other situations the teacher may capitalize on incidents which are relevant and appealing to the student such as changes in weather, current events related to space, and simple experiments.

In view of this situation it seemed reasonable that a beginning attempt to explore the teaching of science to the educable mentally retarded should focus on specifying general objectives and identifying appropriate content to be included in a science program. This document includes general objectives, an outline of content, suggested experiments, and selected starter units. The material is prepared on four levels of difficulty. It should be noted that the suggestions are not to be interpreted as a course of study, rather it is intended to offer special class teachers direction in structuring their science activities.

Organization of the Material

The subject coverage suggested here is spiral in form. This is opposed to the terminal plan of covering a topic on one level with no future development. For the educable mentally retarded, the spiral program carries a subject through several levels for the purposes of reinforcement and more advanced study. It is assumed that the material included for each level will be taught over a period of approximately two years.

Material written for the primary, intermediate, and junior high levels follows a uniform format. The introductory paragraph is intended to state, in general terms, why the particular area of study is important for the educable mentally retarded. Also included are a few suggestions of unit topics relative to the subject area.

The points listed under *General Objectives* may be considered as goals for the study being presented. The first objective: *To develop, through observation and participation, the ability to respond in basic social conversation to . . .* implies that retarded children often do not fully understand concepts underlying facts and occurrences fundamental to daily living. However, we may hope to expose them to general references sufficient to provide a basic familiarity.

The second objective: *To develop ability in relation to . . .* indicates areas of possible understanding by the retardate and implies potential ability or skills as a result of learning. Both areas are designed to promote good mental health through elimination of fears and superstitions regarding natural phenomena.

The third objective: *To develop positive attitudes on the part of students which reflect . . .* pertains to less tangible abilities. These overall attitudes may be reflected by either overt behavior or oral statements.

Initiatory activities are those used to begin a unit study and are suggested for motivation. However, use of incidental motivation should be made whenever possible. Although the selection of situations which might stimulate an interest in particular subject areas is of necessity left to the individual teacher, one purpose of this material is to provide assistance for teachers capitalizing on this sort of interest.

Naturally one cannot expect all areas of science coverage to evolve from motivational occurrences. Certain areas of study may be more effective at one particular time of the year than at another. In such cases, the teacher may employ some of the suggested initiatory activities.

Assimilating materials include suggestions for use in the entire study of a subject. The listing is broken into definite areas for ease in teacher use. Ideas for field trips, speakers, and bulletin boards are examples and are expected to be expanded by the teacher according to specific units presented, particular locale, and school policy. These may also suggest further coverage.

Group and individual activities are intended only to indicate starter points from which the teacher may work in developing a sound unit appropriate for the particular level being taught. It is impossible to predict the abilities present in any given special class situation, and it is therefore anticipated that some suggestions may be either too limited or too advanced for a particular class. For this reason, the material presents varied suggestions rather than specific lesson plans. Seatwork, experience charts, and assistance with experiments will be more adequately developed by the teacher familiar with the specific abilities present.

Culminating activities will often grow out of particular class interests evolved from a unit study. Often, the amount of which has taken place and the resultant enthusiasm will warrant a project such as the display of accomplishments. In other situations, time and level of absorption may evidence need for nothing further than review.

Starter Units

The colored pages in this material mark the inclusion of three Starter Units, provided for organized study of some specific areas. They may also serve as a guide in using the unit method to develop a strong science program. The teacher will then detail this program after a period of

experimenting with the content coverage suggested within this manual. The development of units for the various subject areas should lessen the tendency to merely teach unrelated scientific facts. The unit method will promote and facilitate the establishment of a useful program of science in the curriculum for the educable mentally retarded.

Evaluation Sheet

The evaluation sheet found at the conclusion of this material represent the continuing effort of the Special Education Curriculum Development Center to meet the needs of the Special Class teacher. It is requested that teachers using this material record statements and specific evaluation points as indicated and submit this to the Center.

The time and effort given to this report will be greatly appreciated. You may be assured it will receive serious consideration in structuring guidelines for further development of materials to be disseminated.

PRIMARY LEVEL

ANIMALS

Opportunities to observe, handle, and care for pets at home and in the classroom provide the possibility for a wide range of valuable concrete experiences. This situation, coupled with the natural appeal of animals as a source of interest and curiosity to children, greatly facilitates the teaching of this area of science. Even the study of animals on a simplified level allows children to acquire many basic scientific concepts, including characteristics of living things; the interdependence of man, plants, and animals; and reproduction. It will also help to reinforce such related concepts as the importance of proper care of living things.

A listing of specific material to be presented during the teaching of units on animals should contain suggestions similar to the following: *Pets, Animal Young, Animal Homes, How Animals Get Food,* and *How Animals Move About.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- How animals get food.
- The similarities and differences in animals.
- The needs of animals: shelter, air, water and climate.
- The interdependence of man and animals.
- The relationship of animals to plants.
- The relative size of different animals.

To develop ability in relation to:

- Care and handling of pets
- Recognition of differences and similarities in animals.
- Use of vocabulary related to animal life.
- Animal use of plant life.
- Showing respect for animal life.

- Conservation of animal life.
- Safety habits with animals, i.e., diseased, frightened, dead animals, etc.

To develop positive attitudes on the part of students which reflect:

- An appreciation of animal life as a source of responsibility and pleasure.
- An acceptance of the necessity for proper care of living things.
- A beginning understanding of characteristics basic to all living things as represented by animal life.
- An understanding that some animals may be happier in their natural environment than in captivity.

Activities

Initiatory:

Reading stories about pets and animals.

Discussion of pets that class members might have or might like to have.

Selection of pet(s) for classroom and listing of care assignments to be rotated among all class members.

Use of an incident which could result in high class interest and discussion, i.e., finding a wounded bird or animal, children requesting to bring pets to school, appealing news item related to animal life, collection of student funds for class project such as purchase of pet or fish and equipment.

Observation of animals as they acquire and consume food.

Assimilating:

Field trips to a zoo, pet shop, or farm. Explanatory walks in the school yard, the neighborhood, or a local wooded area.

Speakers such as a pet shop owner, a zoo keeper, a student with an unusual pet, or a veterinarian on safety with pets.

Bulletin boards:

1. Sample animal coverings with pictures (connected by string or yarn) of the animal from which it was taken, i.e., fur, feather, turtle shell, fish scales, hairs.
2. Fabric samples with animals from which they are produced, i.e., sheep, bird, raccoon.

3. Pictures of animals in their natural habitat and the varieties of homes in which they live.

4. Pictures of animals and their young.

Related individual and group activities.

1. Care of animals in classroom.

2. Experience with "touch box" containing varied examples of animal coverings, i.e., fur, feather, scale, shell, tooth, etc.

3. Observation of birds and animals out-of-doors with class discussion and experience chart record of habits and characteristics.

4. Purchase of food and equipment for class pet.

5. Class table for collection and display of animal related objects as incentive for discussion and learning (sample contents: eggshell, nests, cocoon, feathers, starfish, seashells, etc.).

6. Classification of animals as to whether they live in water, on land, or fly in the air; whether they can be found in the zoo, on the farm, in the woods; whether they are suitable or unsuitable for pets.

7. Simple seatwork exercises on animal classification, pets, and animal covering.

8. Write experience charts on animal study experiences.

9. Write experience chart on safety with new pets and strange animals.

10. Learn common names of animals in specific locale and domesticated animals.

Culminating:

Pet show.

Booklet containing experience charts or account of class pet project with photographs or drawings.

Sample Experiments

Objective:

To observe animal movement for purpose of learning methods of locomotion.

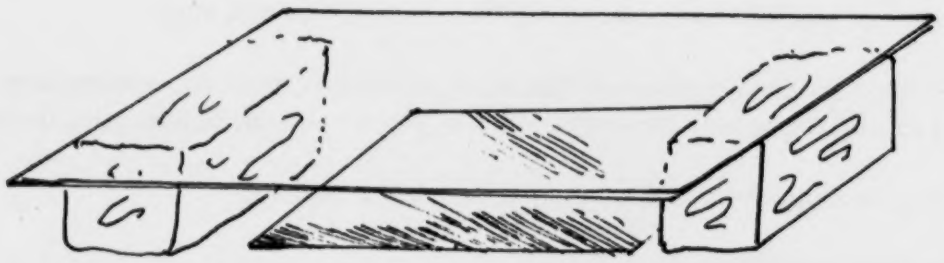
Equipment:

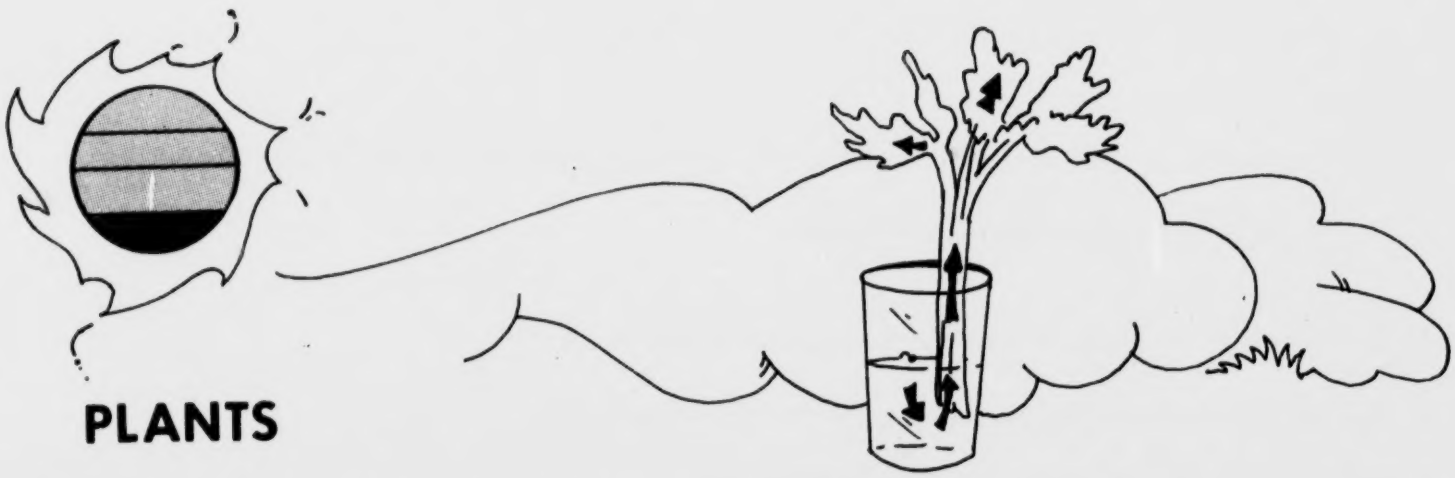
The device is simple to construct and easy to store. It consists of:

2 bricks
1 flat, clear plate glass
1 large plane mirror

Experiment:

Have the students place some bugs, ants, and then earthworms on the plate glass. Observe each animal's movement from above and below (reflected in the mirror). Lizards, tree frogs, and small snakes are especially interesting for this type of study. If the glass is moistened by a small amount of water, snails can also be observed. Pupils can watch how snails overcome obstacles such as marbles, rulers set on edge in a small mound of clay, or thin layers of gravel and sand.





PLANTS

The study of plant life can serve to stimulate the children's interest in their immediate surroundings. Guidance for the retarded is needed to increase awareness of his environment. Pleasure in the beauty of nature, safety in relation to use and exposure to plant life and functional learning related to man's dependence upon animal and plant life are goals of study appropriate to the special class for the mentally retarded.

A listing of specific material to be presented during the teaching of units on plants should contain suggestions similar to the following: *Food Producing Plants, Growing Plants for Beauty, How Plants Get Food, Seeds, How Plants Help Man, How Plants Help Animals, and Gardening.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- The basic needs for plant life: air, water, heat, soil.
- The parts of a plant: roots, stem, leaves, flower.
- The fact that plants have similarities and differences.
- Plants as a source of beauty.
- The relationship of man and animals to plants.
- The necessity of conservation of certain plant life.
- The seasonal growth cycle of plants.

To develop ability in relation to:

- Recognition and beginning identification of plants needed by man.
- Care of plants.
- Recognition of the ways in which plants grow.
- The functions of plant parts.

- Different methods of reproduction, i.e., some plants will grow from seeds or some from roots.
- Use of simple vocabulary related to plant life.

To develop positive attitudes on the part of students which reflect:

- An acceptance of the necessity of proper care of living things.
- An appreciation of beauty provided by plants.
- An appreciation of plants as necessary for survival of life.

Activities

Initiatory:

Use of an incident capable of motivating interest in plants (i.e., spring gardening activities, fall changes in trees and plants, discussion of flowers in classroom or on school grounds or study of food and curiosity as to origin of vegetables).

Field trip to observe plant life and to formulate questions to be recorded as goals for unit study.

Stories about children's experiences with plant life.

Collect flowering plants on field trip.

Assimilating:

Field trips to residential areas, woods, parks, greenhouse, farm, vegetable garden and nursery.

Speakers such as farmer, gardener, or florist.

Bulletin boards:

1. Plants which we eat.
2. Parts of a plant.
3. What a plant needs to grow.
4. Pictures showing animal uses of plants (food, shelter, protection, etc.).
5. Samples of plant parts from which new growth may be started (i.e., leaf of African Violet, stem of ivy, eye of potato, seed of flower, kernel of corn, root, etc.).
6. Pictures of flowers, trees, shrubs, for comparison of sizes.

Related individual and group activities.

1. Experiments with plants showing effect of light, degree of temperature, water, air, and type of soil.
2. Write experience charts on plant experiments, class field trips and things learned.
3. Show pictures of plants and plant experiments.
4. Seatwork exercises on plant life and use.
5. Perceptual experiences with plants: see, feel, smell.
6. Grouping of flowers through sensory experience: by odor, by color, by touch, by size.
7. Experiment with different plants to learn that the number of seeds vary (i.e., apple-few, milkweed-many). Open and count seeds where capable.

Culminating:

Presentation of flowering plants, grown in class, to parent or other chosen person.

Booklet on plant life.

Sample Experiments

Objective:

To learn through observation that roots grow down.

Experiment:

Make a visible germination garden by using two glass plates and a piece of blotter. Sprinkle four or five radish seeds on the blotter and place between the two pieces of glass. Secure with two rubber bands and place in a saucer of water on the window sill. As the seeds begin to sprout, examine them with a magnifying glass. Note the tiny hair-like roots. Notice that the roots will grow down. Turn the garden on one side and look at the roots each day. You will find they have changed direction so as to grow down again.

Objective:

To learn through observation that stems grow up.

Experiment:

Take any pot with small seedlings growing and place it on its side. Watch how the stem turns up.

Objective:

To learn that plants grow toward sun and may be rotated for straight growth.

Experiment:

Leave a potted plant in a window where it gets light only from one side. Watch how the plant grows toward the light. Now turn the plant 180° and observe each day how it turns toward the light.

WEATHER AND SEASONS

Weather and seasonal changes are important areas of functional teaching because of their widespread effect upon human beings. Awareness of these environmental changes as they relate to the protection and comfort of children is of particular importance to the curriculum. Students should learn that many daily life activities and behaviors are affected by these changes. Natural opportunities to observe these changes can be anticipated in all climates. The vocabulary relevant to the teaching of weather and seasons has wide application and can also be emphasized in the teaching units outside the area of science. Sensory experiences may be utilized greatly in observing conditions of weather.

A listing of specific material to be presented during the teaching of units on weather and seasons should contain suggestions similar to the following: *Autumn, Winter, Spring, Summer, Clothing, Weather and Animals, Weather and Plants, Air, and Water.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- Seasonal changes.
- Temperature changes related to seasons.
- Varied weather conditions.

To develop ability in relation to:

- Names of seasons.
- Proper dress for specific weather conditions.
- Estimating thermometer readings as cold, hot, cool, warm.
- Vocabulary related to common weather conditions.
- The effect of weather and seasonal changes on living things.
- Recognizing basic characteristics of air, i.e., has weight and can move things.

- How rain provides water for use by living things.
- Safety in special weather conditions, i.e., snowstorms, ice, tornados or thunderstorms.

To develop positive attitudes on the part of students which reflect:

- Acceptance of knowledge of weather as useful to man because of its effect upon his activity, comfort, and safety.
- An increased awareness of environmental conditions for purposes of pleasure, safety and utility.

Activities

Initiatory:

Daily "weather report" as part of regular classroom opening activities.

Exploratory walks in which conditions of weather and effects of weather are noted.

Collection of questions on weather and seasons contributed through class discussion and experiences.

Assimilating:

Field trips to a windmill or on exploratory walks through woods, open spaces, areas with buildings, schoolgrounds, etc., for observation of effects of wind, clouds, sun, heat and cold.

Speakers such as a science specialist or a local fireman (to tell how dry weather increases incidence of fire, how extremely cold weather affects fire fighting, how firemen protect themselves against weather conditions, etc.).

Bulletin boards:

1. Pictures of varied types of weather.
2. Representative objects and activities for the four seasons.
3. Cut-out illustrations of effect of sun, rain, cold upon plant life.
4. Fabric or pictures representing clothing appropriate for specific weather conditions.

Related individual and group activities.

1. Make a booklet on seasons with pictures and drawings appropriate for each.
2. Use experience charts to survey different types of weather recorded over a period of several weeks.

3. Make weather illustrations for use on class-constructed calendar to record weather account.

4. Use over-sized simulated thermometer for realization that a thermometer indicates temperature change.

5. Do seatwork exercises matching clothing and activity articles for appropriate seasons.

6. Observe and draw pictures of clouds when present. Discuss meaning of clouds, movement by wind.

7. In autumn, have leaf collection, observe how very windy days cause many leaves to fall. Note changes of color in various leaves.

8. On very sunny days, observe shadows outside. When the sun is high the shadows are short, when the sun is low, shadows are long.

9. Make cut-out people and clothes to dress, representing appropriate seasonal clothing. Have large model for daily class use.

10. Dramatize a situation in which weather presents problems to be solved (i.e., "caught in the rain").

11. Summarize daily weather calendar at end of each week (i.e., how many days did the sun shine, when was it coldest and warmest, how many days of rain, etc.). Note if clouds were present when it rained, snowed, or stormed.

Culminating:

Make a multi-phase mural showing varied weather conditions and changes affecting plants, animals, people, houses.

Have a display table for weather experiments. Invite another class to watch experiments with explanations guided by teacher.

Sample Experiments

Objective:

To learn that the sun gives off heat.

Experiment:

Put a tin cover on a window sill in the sun, another in the shade. After a few minutes, compare how they feel. The same experiment may be done with a dark piece of paper.

Objective:

To learn that air can move things.

Experiment:

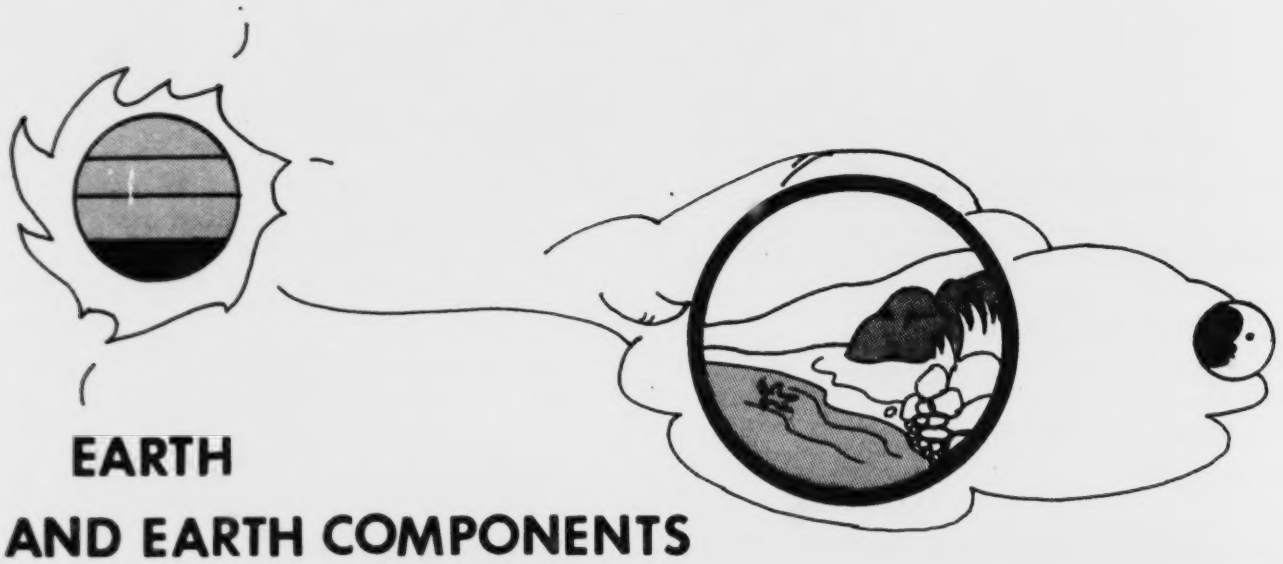
Let children sit in circle at the table or on the floor. Put some pieces of tissue in the middle of the circle. Let children blow through straws toward the paper. Vary the tissue paper with bits of wrapping paper, cardboard, wood chips, etc. Let the children give names to the amount of air necessary to move them. For example: "soft breeze," "windstorm," "strong breeze," etc.

Objective:

To learn that moisture will evaporate into the air.

Experiment:

Wipe a streak of moisture across the chalkboard with a wet cloth. Count and see how long it takes to disappear. Put two wet streaks of moisture across the chalkboard. Blow at one of them, or fan it. Which one disappears first?



EARTH AND EARTH COMPONENTS

At the primary level, the purpose of a study of the earth and its components is to lay foundations for later study. The concept of the size of the earth will be most difficult for students at this level to understand. Maybe they will accept the idea that it is larger than anything they will ever see. Knowledge of soil, sand, rocks, and water will involve more direct exposure to parts of their immediate environment than concepts of general earth components. However, the concept should be basically presented, as should the use of a globe and the statement of the earth as being round and surrounded by air. These ideas should be presented as things they will learn more about later, but pointed up whenever current news or local happenings relate to them. This social emphasis and use of such knowledge should be remembered by the teacher as goals for studying the earth.

A listing of specific material to be presented during the teaching of units on the earth should contain suggestions similar to the following: *Land, Water, Air, Rocks, and Conservation.*

General Objectives

To develop through observation and participation, the ability to respond in basic social conversation to:

- The shape of the earth.
- The fact that the earth is very large.
- The fact that earth has soil, rock, and water.
- The fact that the earth is surrounded by air.

To develop ability in relation to:

- Comparison of size concepts: big and little.
- Comparison of shape concepts: round, flat, square, triangle, and rectangle.
- Comparison of textures: smooth, rough, wet, dry.
- Recognizing the states in which water may be found (steam, ice, liquid) and that large bodies of water form streams, lakes, rivers, and oceans.

- Vocabulary related to basic, common earth components.
- The effects of interaction of water and soil.
- The fact that air is necessary for life.

To develop positive attitudes on the part of students which reflect:

- An appreciation of conversation practices as necessary to preserve life on earth.
- An acceptance of the basic idea that the earth is round, large, and made up of different kinds of matter.
- An appreciation of pleasure derived from experiences with earth matter.
- Interest and curiosity in natural surroundings.

Activities

Initiatory:

Presence of world globe in the classroom.

Display of rock collection.

Use of playtime in sandbox, with clay or water to stimulate questions and interest.

Assimilating:

Field trips such as exploratory walks to specific areas for viewing rocks of different sizes (those which children can stand on as well as some they may hold in their hands) and bodies of water (different sizes such as streams, lakes, rivers, where possible).

Speakers such as a person with rock collection to show children variety in sizes, shapes and textures.

Bulletin boards:

1. Landscape pictures illustrating various types of earth surfaces: mountains, plains, valleys, bodies of water, deserts, etc.
2. Samples of some things moved by air: seeds, leaves, milkweed, soil, cloud (use cotton), etc.
3. Pictures and objects with contrasts in size, texture, and shape.

Related individual and group activities.

1. Experiments showing that air cannot be seen, but is real and takes up space.
2. Experiments showing that air moves things (especially soil).

3. Sandbox or work table play in which landscape is formed with mountains, valleys, hills, etc.

4. Display or collect rock samples. Allow games of separating smooth rocks from rough rocks.

5. Compare consistency of soil, natural clay, and sand (show how water seeps through each type).

6. Discuss different kinds of land areas visited or lived in by students. If possible, provide pictures relating to each.

7. Use of senses to group rocks: color, feel, size, weight, sound when dropped, rocks that make marks, hard rocks, crumbly rocks.

8. Write experience charts on experiments and exploratory walks.

Culminating:

Review experience charts.

Use field trips and walks to note incidents of learning from study.

Sample Experiments

Objective:

To understand that air is everywhere, though it cannot be seen.

Experiment:

Have students fan the face with a piece of paper. Explain, "You feel something, but cannot see it. The paper did not touch you and there was nothing present before or after fanning that was not there when you fanned, so what you felt must be air."

Objective:

To see that air occupies space.

Experiment:

Provide balloons for class members to blow up, one at a time. Give opportunity for individual observations on what happens to the balloon, what individual does to it, etc. Lead students to understand that air went into the balloon, the balloon got bigger, because more space was needed for the air. Have class repeat what they have learned: air takes up space (or room).

Objective:

To understand that the wind changes the earth's surface.

Experiment:

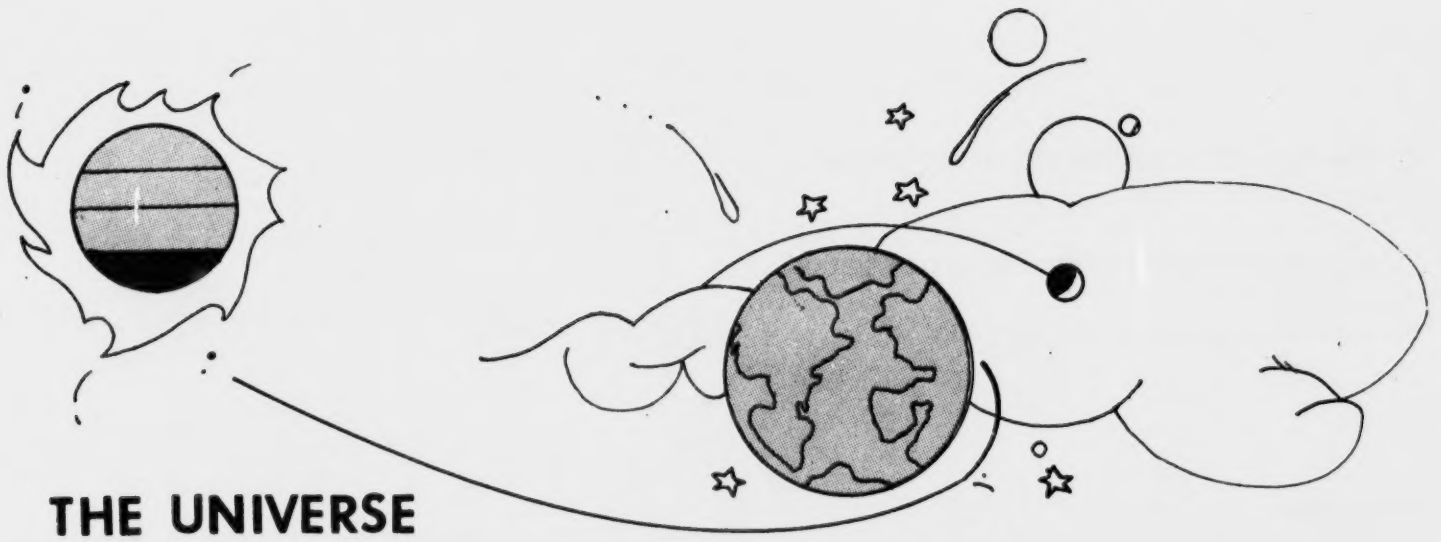
Place a pile of sand in a carton that has one side cut away and watch how the pile (hili) is eroded away as you gently blow over the surface from the closed end. This should be preceded and followed by trips to actual areas where erosion is evidenced, with reference to the classroom experiment as showing how this happens.

Objective:

To learn that rain wears away rock and moves soil.

Experiment:

Pile sand in a large pan. Take a sprinkling can or any perforated can filled with water and simulate rain falling on a hill. Watch how rivulets form and carry away the top soil. Use field trip to point up evidence of this wherever possible, relating it to classroom experiment.



THE UNIVERSE

Concepts of space and what it contains (i.e., moon, sun, and stars) are abstract and difficult for the retarded child to grasp. Rather than to be discouraged by this fact, the primary teacher should view his science instruction as an opportunity to guide the child's learning from simple observations and basic characteristics to the goal of increased awareness. This area should stress the use of experiences in observation and the actual involvement of children.

A listing of specific material to be presented during the teaching of units on the universe should contain suggestions similar to the following: *Space, Moon, Stars, Sun: Heat and Light, Day and Night.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- The fact that space surrounds the world.
- The fact that an object looks smaller when it is far away.
- The fact that the sun provides light and is very hot.
- The fact that the moon, stars, and sun are very far from earth.

To develop ability in relation to:

- Recognition of the sun's contribution to living things.
- That the sun can be dangerous (i.e., sunstroke, eye damage).
- Realization that appearance of size is related to distance.
- Space as important to modern scientific study.
- The length of daylight varies with the seasons.
- Observing differences in moon, stars and sun.
- Basic vocabulary related to common references of the universe and what it contains.

To develop positive attitudes on the part of students which reflect:

- An appreciation of the beauty of the universe.
- An acceptance of the fact that the earth is part of the universe.

Activities

Initiatory:

Demonstrations and experiments to illustrate the effect of distance upon appearance of size.

Experiments with plants, dark paper, fabric to illustrate the heat of the sun.

Demonstrations to illustrate the rotation of the world around the sun with models, balls, or students.

Discussion and observation of the varied lengths of daylight through different seasons.

Assimilating:

Field trips for outdoor observation of sky (caution students not to look directly into the sun) and to an observatory, if available.

Speaker such as science teacher to illustrate movement of earth, effects of sun, etc. – more technical areas to be simplified.

Bulletin boards:

1. Representation of universe with cut-outs of world, sun, moon.
2. Pictures of modern space activities.
3. Illustrations of man's uses of the sun.

Related individual and group activities.

1. Experiments with sun heat.
2. Collection of current events (from newspapers and magazines) related to space programs, eclipses, etc.
3. Experience chart accounts of observations, experiments, and learning.
4. Take trip to high point (hill or tall building) to illustrate the effect of distance on the appearance of objects.
5. Compare length of day with recorded observations of amount of light when arising in summer and in winter.

Culminating:

Review experience charts.

Sample Experiments

Objective:

To understand what causes day and night.

Experiment:

With light out and shades down, shine a flashlight on a globe of the earth. A flag may be used to pinpoint your locale. Rotate the globe in a counter clockwise direction, pointing out that the lighted part indicates daylight, the unlighted, dark. Allow students to turn globe, move with flagged area, to grasp the concept more thoroughly.

Objective:

To illustrate that distant objects look smaller.

Experiment:

Have a child stand close to the other children holding a large ball. Now have the child with the ball move some distance away. Ask the children if there has been a change in the size of the ball and/or the child.

FORCES

Included in the area of forces for the primary level are the subjects of fire, sound, and electricity. These are important areas of study which will relate to life activities and are thereby considered highly functional for the mentally retarded. Knowledge and abilities related to these subjects should be emphasized throughout a science program for the educable mentally retarded. Coverage on the primary level should provide an awareness of the importance of the forces to man, should stimulate interest and curiosity for further study, and should begin acquisition of basic skills in safety.

A listing of specific material to be presented during the teaching of units on forces should contain suggestions similar to the following: *How Man Uses Fire, Safety With Fire, Sound, Simple Tools: Use and Care, Wheels, Safety Around Electricity, Electricity at Home and School, Magnets and Toys That Move.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- Fire as a force which may produce good and bad effects for man and which may be controlled by man.
- Sound as important to man for communication and knowledge.
- The fact that electricity helps man in many ways.
- The basic effects of magnets.

To develop ability in relation to:

- The fact that all fire needs air in order to burn.
- The fact that fire has many uses.
- The danger of fire.
- The fact that sounds may be loud or soft.
- The fact that sound comes from many sources.

The fact that some things may be heard and not seen.

Safety with electrical appliances and outlets.

Basic functional uses of magnets.

Vocabulary functionally related to forces studied.

The care and use of simple tools.

To develop positive attitudes on the part of the students which reflect:

A beginning appreciation and respect for work.

An awareness of the necessity of safety habits in relation to fire, sound, electricity, tools and machines.

A beginning appreciation of man's utilization of forces around him.

Activities

Initiatory:

Use of Fire Prevention Week to introduce unit on fire.

Play a sound game in which students (with eyes covered) guess source of familiar sounds from recording or through imitations by other students. Initiate questions about sounds.

Feel vibration of objects producing sound (i.e., tuning fork, guitar string).

Point up electrical objects in classroom (lights, radio, phonograph, aquarium filter, movie projector, etc.), asking students what makes them work. Suggest some other uses of electricity and promote questions to be answered by study.

Assimilating:

Field trips to a fire station; exploratory walk for listening experiences (have students note different kinds of sounds, loudness and softness); and if possible, construction site on which machines are used. (Pre-planning of trip with arrangements through personnel might include having a worker tell students of safety measures observed.)

Speakers such as a fireman, a machine worker to describe importance of safety on the job, or a science teacher for demonstration of magnets.

Bulletin board:

1. Pictorial illustration of class and school fire drill regulations.

2. General rules for procedures in case of fire.

3. Pictures illustrating things being heard but not seen, i.e., telephone voice, radio, thunder, airplane above the clouds.

4. Good rules for taking care of tools.

5. Illustrations of tools which primary children might safely use, and care of them.

Related individual and group activities.

1. Discussion and dramatization of what to do in case of fire.

2. Experiments showing that fire must have air to burn.

3. Experiments showing that some materials burn and others do not.

4. Booklet on ways in which fire helps man with simple statements to label drawings or pictures cut from magazines, i.e., fire keeps us warm, fire cooks our food, fire gives us light.

5. Experience chart accounts of observations and experiments on forces.

6. Experiments with sounds.

7. Experiments with magnets.

8. Have students contribute to class list of electrical appliances in their homes. Make list of safety habits to be practiced with these.

9. Have telephone practice in proper handling of the instrument.

10. Class access to simple tools through table display and opportunity to use, i.e., hammer, nails, sandpaper, etc.

Culminating:

Review experience charts.

Sample Experiments

Objective:

To learn that sound travels through solid things.

Experiment:

Show class how to construct tin can telephones to experience sound traveling through string. Use two cans; remove one end from each can and punch a small hole in the other end of each. String a thread through the holes, securing it with a large knot or by knotting the string through a button. The cans are to be held by two students far enough apart to keep the string taunt. While one student speaks into his can, the other student holds his can to his ear. Each student should have an opportunity to participate in the experiment.

Objective:

To show that fire needs air.

Experiment:

Light a candle, then place a glass over it. The fire is extinguished because it could get no air. Explain to students that this is the reason for learning not to run if your clothing should catch fire (running gives more air to the fire). Rolling in a blanket shuts the air off from the fire. This is also the reason for closing windows when there is a fire drill.

Objective:

To learn that sound is caused by vibration. Explain and illustrate vibration prior to experiment.

Experiment:

Put a rubber band around an empty cigar box without a cover. Snap the band and listen. Observe the vibrating rubber band. If you grasp the band, stopping its vibration, the sound stops. Apply this principle to stringed instruments.

Objective:

To learn that magnets will attach to items containing iron or steel.

Experiment:

Place several paper clips on a table and cover them with a piece of paper. Now, touch the paper with the magnet and at the same time lift both the paper and the magnet. Watch how both the paper and paper clips are lifted. (Let the students experiment with paper alone so they do not get the impression that magnets will lift paper.)

Another experiment for this objective: Place a coffee can on its side on top of a thin piece of wood such as a cigar box top. By moving the magnet under the wood you can roll the can back and forth.

Suggested Resource Materials

Primary Level

Banks, M. A., *How we celebrate our fall holidays.* Chicago: Benefic Press, 1961.

Banks, M. A., *How we celebrate our spring holidays.* Chicago: Benefic Press, 1961.

Berg, J. H., *Big bug, little bug.* Chicago: Follett Publishing Co., 1964.

Green, M. M., *Everybody has a house.* New York: Young Scott, 1944.

Green, M. M., *Everybody eats.* New York: Young Scott, n.d.

King, P., *Mabel the whale.* Chicago: Follett Publishing Co., 1958.

Parker, B. M., *Spring is here.* Evanston, Illinois: Row, Peterson & Co., 1960.

Parker, B. M., *Summer is here.* Evanston, Illinois: Row, Peterson & Co., 1960.

Parker, B. M., *Winter is here.* Evanston, Illinois: Row, Peterson & Co., 1961.

Provus, M., *How weather affects us.* Chicago: Benefic Press, 1963.

Udry, J. M., *A tree is nice.* New York: Harper & Brothers, 1956.

Filmstrips

Order from: Eye Gate House, Inc.; 146-01 Archer Avenue; Jamaica, New York 11435

Series: *Fundamentals of Science; Grade 1*

105A Spring & Summer
105B Autum & Winter
105C Air, Wind & Weather
105D Just Animals
105E Animals Grow & Change
105F Plants Grow & Change
105G Experiences with Water
105H Sounds Around Us
105I Rolling Along (Wheels)

Series: *Animals on the Farm*

89A Dinky, the Calf
89B Fluffy, the Chick
89C Frisky, the Colt
89D Billy, the Goat
89E Tiny, the Kitten
89F Fleecy, the Lamb
89G Porky, the Pig
89H Pal, the Puppy
89I Our Poultry Farm (Ducks, Geese, Turkeys)

STARTER UNIT

PRIMARY LEVEL

OUR PETS

This unit was originally written by Gretchen Holsten
for a course in Curriculum Development for the
Mentally Retarded at the University of Iowa.

OUR PETS

Rationale

This unit was selected because children are acquainted with their own pets, and it would be motivating to start the year with something that is familiar and interesting to them. They will feel more relaxed and free in school.

Sub-Units

Family	Food	Health Habits	Courtesy and Attitudes
Home	Clothing	Safety	

General Objectives

To develop the ability to recognize that a pet is an animal which is not wild and is treated with affection.

To develop the ability to identify and compare members of some specific animal families.

To develop the ability to identify animals in both early and late stages of growth, i.e., kitten, cat; chick, hen.

To use field trip experience to identify animals as young or as adult.

To recite, list, and make art display of observations from field trip.

To develop ability to make an appropriate home for a pet.

To develop the ability to purchase pet food.

To recognize different coverings of pets.

To develop the ability to bathe pets which do not clean themselves.

To recognize that pets need to sleep and exercise.

To learn procedures which protect pets.

To recognize acts of kindness which are appropriate with pets.

Core Area Activities

Arithmetic Activities

Count the number of pets at home and on pictures.

Make comparisons of pets — large, small; long, short.

Figure cost for fish in an aquarium; cost for an aquarium; cost food.

Measure the amount of sand and water needed for an aquarium.

Make comparisons of cages – rectangular, square.

Time when pets should be fed.

Measure food for pets.

Worksheets on counting pets, cages, etc.

Social Competencies

Plan a visit to a home or a farm where there are a few families of pets.

Invite class to pet show.

Plan a visit to a pet shop to see homes and buy fish.

Cooperate in taking turns in feeding the fish.

Plan a trip to the grocery store to examine food for pets.

Plan a field trip to courthouse to see where we get a dog license.

The children should learn through experience the proper way to handle pets. Demonstrate.

Make guests welcome at pet show.

Prepare booklet on "Our Pets."

Demonstrate care of a pet at home.

Communicative Skills

Write and illustrate experience charts.

Use telephone to call farm, and veterinarian.

Write an original story about a pet.

Label members of pet families, food, pets, cages, etc.

Discuss likenesses and differences of pets and members of pet family.

Listen to tape of pet sounds.

Have children tell about the pictures of pets which they drew.

Make a chart with day and name of child responsible for cleaning aquarium and feeding the fish.

Write thank-you notes to places where they have visited.

Dramatize stories, poems, actions of pets, etc.

Use magazines to find pictures of pets, ads on food for pets.

Tell what the covering of a particular pet looks and feels like.

View films and filmstrips on pets and care of pets.

Discriminate colors of pets.

Write sentences and missing words from experience charts.

Write an invitation to another class to pet show.

Learn oral and recognition vocabulary words.

Listen to books, poems, and learn finger plays about pets.

Health

Have veterinarian talk on diseases of pets.

Give a dog a bath in class.

Demonstrate proper way to wash hands after holding pets.

Plan food for a family of pets.

Observe pets sleeping and exercising.

Have children share responsibility of keeping aquarium clean.

Brush a dog or cat of loose hair.

Prepare bulletin board on sleep habits of pets.

Check homes for pets in classroom and home to assure safety measures.

Use toy telephones to call veterinarian in case of an emergency.

Safety

Demonstrate safe places to put pet's food to keep away from small children.

Demonstrate safe ways of handling the food of pets.

Dramatize ways of handling pets safely.

Dramatize meeting strange pets when alone and with your own pet.

Vocational Skills

Care for pets in the classroom — responsibility.

Emphasize following directions in care of pets.

Have the children buy the fish for the aquarium.

Fill out application for dog license.

Resource Materials

pictures of pets

pets which can be obtained

trip to pet store

trip to the farm

trip to the courthouse

trip to the grocery store

field observations in neighborhood

flannel board and objects

experience chart and paper

samples of coverings of pets

pictures, labels, and actual food pets eat

posters of pet care

models of pet's homes

films and filmstrips

animal stories and books

bulletin board displays

scrapbooks, paper, paste, pictures, magazines

aquarium, sand, snails, fish, etc.

calendar

clock with moveable hands

poems and finger plays

easel

free materials

records and record player

tapes and tape recorder

models of pets

slides and slide projector

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
To recognize that a pet is an animal which is not wild and is treated with affection.	Use prepared tape of pet sounds and provide appropriate pictures. Let children respond freely as to what the sounds are.	tape recorder prepared tape of pet sounds	drawings of pets
	What kinds of animals are the cat, the dog, etc.? (pets)	pictures of pets	
	Show pictures of various animals and ask, "Would this be a good pet?" Discuss. (Use at end of unit again.)	pictures of animals	
	Let children tell pets they have at home; how many they have; names of pets. Write pet and name on the board beside name of pupil.	blackboard, chalk	
	Experience chart	experience chart paper	*Our Pets* It is nice to have a pet. A pet is an animal which is not wild. We have many different pets. Pets are fun.
	Read poem: "Little Pussy" p. 103 in *Poems and Rhymes* I like little Pussy, Her coat is so warm; And if I don't hurt her, She'll do me no harm. So I'll not pull her tail, Nor drive her away, But Pussy and I Very gently will play.	*Poems and Rhymes* Childcraft, Vol. I; Field Enterprises Educational Corporation, Chicago, 1967	
	Learn Finger Play: "Kittens and Puppies"	"Kittens and Puppies" *Kindergarten Keys: A Curriculum Guide for Kindergarten Teachers;* Champaign Comm. School District 4; Champaign, Ill.; 1965	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	Seatwork: Have children draw and color their pet(s). Those who have none may choose one that they would like to have. Label picture with pet's name – put on bulletin board entitled "Our Pets" with picture under each student's name.	crayons manilla paper bulletin board	
To identify and compare members of some specific animal families	Review concepts of previous lesson by reading names of the children's pets on the bulletin board.	bulletin board	
	Introduce rabbit family on flannel board. Count the number of pets in the family. Refer to the family members as mother, father, and young. Show name of the family. Discuss that these come from the mother while the chicken family (display on flannel board) was hatched from an egg. Show picture of a chick coming from an egg.	flannel board rabbit family and chicken family for flannel board	picture of a family of pets
	View movie: "Baby Animals" University of Iowa	film: "Baby Animals" U-2956 11 min., Audio-visual Center, Div. of Extension & University Services, Univ. of Iowa, Iowa City, Iowa	
	Write experience chart. Read orally.	experience chart paper	*Pets Have a Family* Pets have a mother, father, and young. A chicken comes from an egg. A rabbit comes from the mother. The mother pet takes care of her young.
	Read book: *The True Book of Animal Babies*	*The True Book of Animal Babies;* Illa Pondendorf; Children's Press	
	Review finger play: "Kittens & Puppies"		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	Seatwork: Duplicate experience chart and leave out the following words: mother, father, chicken, young. Have them draw a young pet on the bottom.	ditto master	
To identify animals in both early and late stages of growth	Review experience charts *Our Pets* and *Pets Have a Family.*	experience charts: *Our Pets, Pets Have a Family*	
	SVE pictures "Farm and Ranch Animals" (horse & colt, hen & chicks, sheep & lamb) or CES pictures "A Trip to the Farm" (horse, cow, chickens, sheep) or picture file of young animals with parents. Discuss the likenesses and differences between the parents and the young especially bigger and smaller. Show a picture of a baby and let them compare how the children looked then and how they look now. Discuss the things that made them grow.	Set SP-106 "Farm and Ranch Animals; Society for Visual Education, Inc.; 1345 Diversy Parkway: Chicago, Ill. 60614 "A Trip to the Farm" A1535; Creative Educational Society, Inc.; Mankato, Minn. 56002 Picture of human baby	Picture of a young pet and grown up pet.
	Show the pictures of the pets again and have children tell the names of the young and parents. Point out differences – cat, kitten; hen, chicks. Dramatize: "Growing Up" p. 41, *Life Around Us;* revised. As you grow up, you change in many ways. It is the same with animals. An animal grows until it is, As tall as a giraffe Or as big as an ox, Or as fat as a pig, Or as strong as a bull, Or as fierce as a lion, Or as graceful as a cat, Or as sly as a fox, Or until it is as grown-up as it can be.	*Life Around Us,* Childcraft, V. 4: Field Enterprises Educational Copr., Chicago, 1967	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHARTS
	Write experience chart.	experience chart paper	*Our Pets Grow* Young pets grow. Pets look like their mother and father then. Our pets eat, sleep, and play to grow. We grow too.
	Read: *All Kinds of Babies and How They Grow* and *Green Eyes*	*All Kinds of Babies and How They Grow,* Millicent Selsam; William Scott: New York, 1953. *Green Eyes,* Abe Bernbaum, Capitol Publishing Co.: Irvington, N.Y., 1953	
	Plan trip to the farm to see young animals. (Alternative: trip to home of someone who has a pet who has had young.) Decide what to say when we ask to visit. Call in class. Mark date on calendar.	telephone	*Rules for Our Trip* 1. Stay with your partner. 2. Sit down on the bus. 3. Listen to the man at the farm. 4. Do not touch anything unless told you may. 5. Thank the man when you leave.
	Seatwork: Worksheet No. 1b. Cut out young and paste on top of parent's picture. Color.	Worksheet No. 1b. paste, scissors, crayons	
To use field trip to identify animals as young or as adult	Stress experience chart: *Rules for Our Trip*	experience chart: *Rules for Our Trip*	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHARTS
	Review pet pictures of those to be seen.	pictures of pets on farm	
	Take trip.	field trip to farm	
	Check rules off as to whether they were accomplished when class returns from trip.		
To recite, list and make art display of field trip observations	Discuss trip: things which we saw, things we did, things we enjoyed. Write experience chart about trip. Write a brief thank you note to the farmer on blackboard; copy to paper; have children sign their names	experience chart paper blackboard, chalk 8½" x 11" paper envelope, stamp	*Our Visit to the Farm* We went to the farm. We saw the young animals and the mothers. We held the new puppies. The farmer showed us the mother pigs and the young pigs. We had fun.
	Seatwork: Make a cardboard box diorama of pets seen on the farm. The open side of the box becomes the front. The top may be open or not. The background (inside the back of the box) can be painted, decorated with cutouts, or papered. Extend this decoration to the side too. The pets in the background may be colored on or pasted onto the back. The pets in the front should be stand-ups. The bottom of the box can be covered with construction paper to represent grass, if desired.	large cardboard box crayons scissors construction paper paste paint	
To make an appropriate home for a pet	Review past experience chart: *Our Pets Need a Home*	experience chart: *Our Pets Need a Home*	
	Bring out empty aquarium and ask children what they think that we could use this for. Discuss. What else is needed in order to put fish in the aquarium.	aquarium	drawing of an aquarium
	Review measuring 1" from arithmetic		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHARTS
	View film: "A Balanced Aquarium," 11 min.	Film: "A Balanced Aquarium," Encyclopedia Britannica Films, 7150 Wilmette Avenue, Chicago, Ill.	
	Discuss procedure for making an aquarium.		
	Write experience chart.	experience chart paper	*Making Our Aquarium* We are going to make a home for fish. We put sand, water and water plants in the aquarium. We must wait 2 days to buy our fish.
	Have children prepare the aquarium. Wash course sand in boiling water. Put sand in the aquarium to 1" depth. Put a piece of wax paper over the sand to prevent stirring up. Fill with water to within 1" of top. Add water plants.	course sand large piece of wax paper water water plants	
To gain understanding that pet's homes must be clean.	Review procedure used to make an aquarium.		
	Review date on calendar for trip to pet store to get fish and see the homes. Count the days.	calendar	
	Display a bird cage used before, but show it not cleaned. Ask children if this is a good home for a bird. What can be done to keep it clean? How often?	bird cage	
	Display aquarium. Stress care in not touching fish; what to do with fish when cleaning tank.	aquarium	
	Demonstrate how to clean the bird cage and the aquarium.		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHARTS
	Have children bring the homes they made for pets (see Learning Aids No. 1) and demonstrate how they would keep their cage clean. Assist.	children's model of homes	
	Add responsibility of cleaning the aquarium to the duty chart (see Learning Aids No. 2).	duty chart	
	Write experience chart.	experience chart paper	*Keeping Pet's Homes Clean* Today we learned how to keep our pet's homes clean. We must clean them once a week or more. We put the pet in a safe place while cleaning. We use fresh water to clean the home. A clean home keeps our pet healthy.
	Seatwork: Have them copy one sentence from the chart, draw a picture of a clean cage. Finish booklet cover which has traced pet from fabric or corrugated paper glued onto drawing or construction paper.	glue or paste writing pap booklet cov fabric or co rugated pap
To develop an understanding of food that pets need	Review chart: *Pets Need Food to Grow.* Examine the display of cans and boxes of actual food that we feed our pets. How will we know whether it is food for a dog or a cat? Can we always tell? Could we ask someone? What foods do our pets need to eat?	Chart: *Pets Need Food to Grow* cans and bo of pet foo
	Use flannel board with pets and pictures of foods needed. Put names of pets on flannel board.	flannel board; objects of pets and pictures of foods needed

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHARTS
	Add duty of feeding the fish to the duty chart.	duty chart	
	Plan a trip to the grocery store to see the animal food that they have. What pet food will we look for? Make a list to be checked off when at grocery store (transfer to paper later.	blackboard, chalk	
	Write experience chart. Read orally.	chart paper	*Pets Eat Different Foods* Our pets eat many kinds of food. All pets like fresh water. The food must be fresh. We can get the food from the grocery store or pet store.
	Learn finger play.	finger play	
	Seatwork: Learning Aid No. 3.	pictures of pets	
To recognize different coverings of pets	Bring out "touch box." Blindfold one person and have them reach in and bring out something. Instruct others not to tell. Blindfolded child feels and guesses what it is. Do until box is empty.	touch box with animal coverings -- rabbit fur, feather, scale, hair from dog and cat	
	Discuss with aid of coverings (which all may touch) and pictures, that not all pets have the same covering. Label each with picture, covering, and name of pet. What happens when we have cats and dogs around us? Do they lose their hair? Do you ever get any on you? Is it good to sleep with pets?	pictures of pets	Paste a feather, some fur, a scale to bottom of the experience chart.
	Discuss color of coverings.	color chart	
	Write experience chart.	chart paper	*Pets Have Clothes* Our pets have different kinds of clothes. We call these coverings. Some

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHARTS
			have fur and some have hair. A fish has scales and a turtle has a shell. Pets lose their coverings, but grow new ones. We have to change our clothes, but pets do not.
	Read poem with picture of shaggy dog. The Hairy Dog My dog's so furry I've not seen His face for years and years; His eyes are buried out of sight, I only guess his ears. When people ask me for his breed I do not know or care: His has the beauty of them all Hidden beneath his hair. Herbert Asquith	picture of dog *Sung Under the Silver Umbrella,* Assoc. of Childhood Ed., Macmillan Co.: New York, 1961 p. 59	
	Read book: *When Animals Change Clothes*	*When Animals Change Clothes,* Charles May, Holiday House, none, 1965, pp 7-9, 11-17	
	Seatwork: Worksheet No. 3		
To develop ability to bathe pets which do not clean themselves	Review chart: *Pets Have Clothes* How do we keep clean? How often do we take a bath? Do you ever give your pet a bath?	Chart: *Pets Have Clothes*	
	Discuss different pets and determine whether we give them a bath or they give themselves one. Show picture of cat licking himself.	picture of cat cleaning himself	

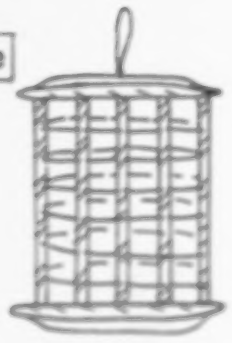
OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	How often should we give a dog a bath? Bring out calendar and show that a good time to give a dog a bath is at the end of the summer and at the end of winter. Review seasons.	calendar	
	Discuss what we need to give a dog a bath and write on board. Discuss the procedure of giving a dog a bath. (Give bath next day in class.)	blackboard, chalk	
	Write experience chart.	chart paper	*Giving A Dog a Bath* 1. Put warm water and dog soap into a large pan. 2. Hold the dog in the pan so he won't get away. 3. Have someone else scrub him. 4. Rinse the soap off with warm water. 5. Dry him with a towel.
	Seatwork: Make a picture box to illustrate how to wash a dog. Have children draw and color pictures on white paper in the correct sequence. Cut a hole in a cardboard box large enough for picture roll to be drawn through.	cardboard box roll of white paper crayons pencils two dowels scissors	
To recognize that pets need to sleep and exercise	Elicit discussion from bulletin board display (Learning Aid No. 4).	bulletin board	
	Discuss why we need sleep and why pets need sleep. Show colored slides on pets sleeping.	slide projector slides on pets sleeping and exercising	
	Discuss why pets play and why children play. Show colored slides on pets exercising.		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHARTS
	Play "Who Am I?" Have children pick a pet and show others how they move or run and have the others guess what pet it is.		
	Write experience chart.	chart paper	*Pets Need to Sleep and Play* Pets need to sleep to grow. We grow when we sleep too. Pets need to play to get exercise. Exercise makes them grow. We grow if we exercise.
	Read book: *A Time For Sleep: How the Animals Rest.* As it is read have all children dramatize.	*A Time For Sleep: How the Animals Rest,* Millicent Selsam; William Scott, Pub.: New York, 1958	(Drawings of pets sleeping and exercising done by children on bottom of the chart.)
	Seatwork: Have children write title of experience chart on a piece of paper and illustrate for their booklet.	plain paper crayons	
To learn procedures which protect our pets.	Bring out a leash, dog collar, dog license and bell. Discuss what we use these for. Emphasize why these protect our pets.	leash, dog collar, dog license, bell	
	Ask how many of their dogs have a license. Do they know where they get the license?		
	Show a picture or drawing of the local courthouse. Explain that we can get them here if we live in town. If we live in the country a man comes to our farm.	picture or drawing of courthouse	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHARTS
	Discuss what we would do to ask for a dog license. Write on the board. Role play by having one person behind the desk and another asking for a dog license. Have each child give his name, address, name of pet, and telephone number. Write this on the board or on the experience chart. Discuss word application. Plan for trip to courthouse to ask for a dog license. Review rules for field trips.	blackboard, chalk or experience chart	
To recognize acts of kindness which are appropriate with pets.	Encourage children to tell or demonstrate a trick or clever thing that their pet can do. Talk over the fun that we have with our pets. Discuss: How a dog acts when we come home from school, when we refuse to play with him, when you have been naughty or teased him. Does your parakeet entertain you with stunts when you pay attention?		
	View filmstrip: "My Bunny"	"My Bunny" n 26H, Eye Gate House, Inc., 146-01 Archer Ave., Jamacia, N. Y., 11435	
	Write experience chart.	chart paper	*Kindness to Pets* A pet is fun when we are kind to him. We must not tease or get him angry. We should play with him a lot. We can teach our pets new tricks.
	Learn song and actions: "Little Dog, What Do You Say?"	p. 143, Ginn and Co. Boston, 1959.	
	Read: *Marshmallow* by Clare Mewberry.	*The First Grade Book Marshmallow,* Clare Mewberry; Harper & Bros., N.Y., 1942	
	Evaluation: Discern children's learnings from this unit. Review old finger plays learned in the unit. Review a few experience charts. Dramatize some learnings. Discuss pictures and sounds that were in the beginning of the unit.	Unit learning materials to be used in evaluation.	

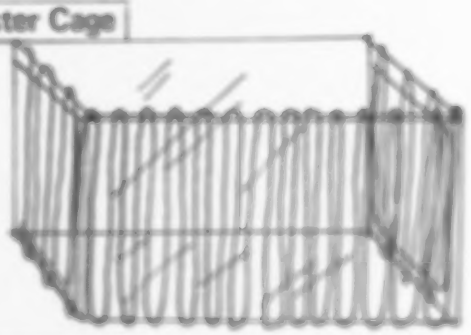
LEARNING AID NO. 1

Bird Cage



Make from two paper plats and drinking straws. A large needle andstring can be used to sew through straw and plates. Hang.

Hamster Cage



Use shoe boxes for the cag. String can be used as the bars.

Cat or Dog Bed

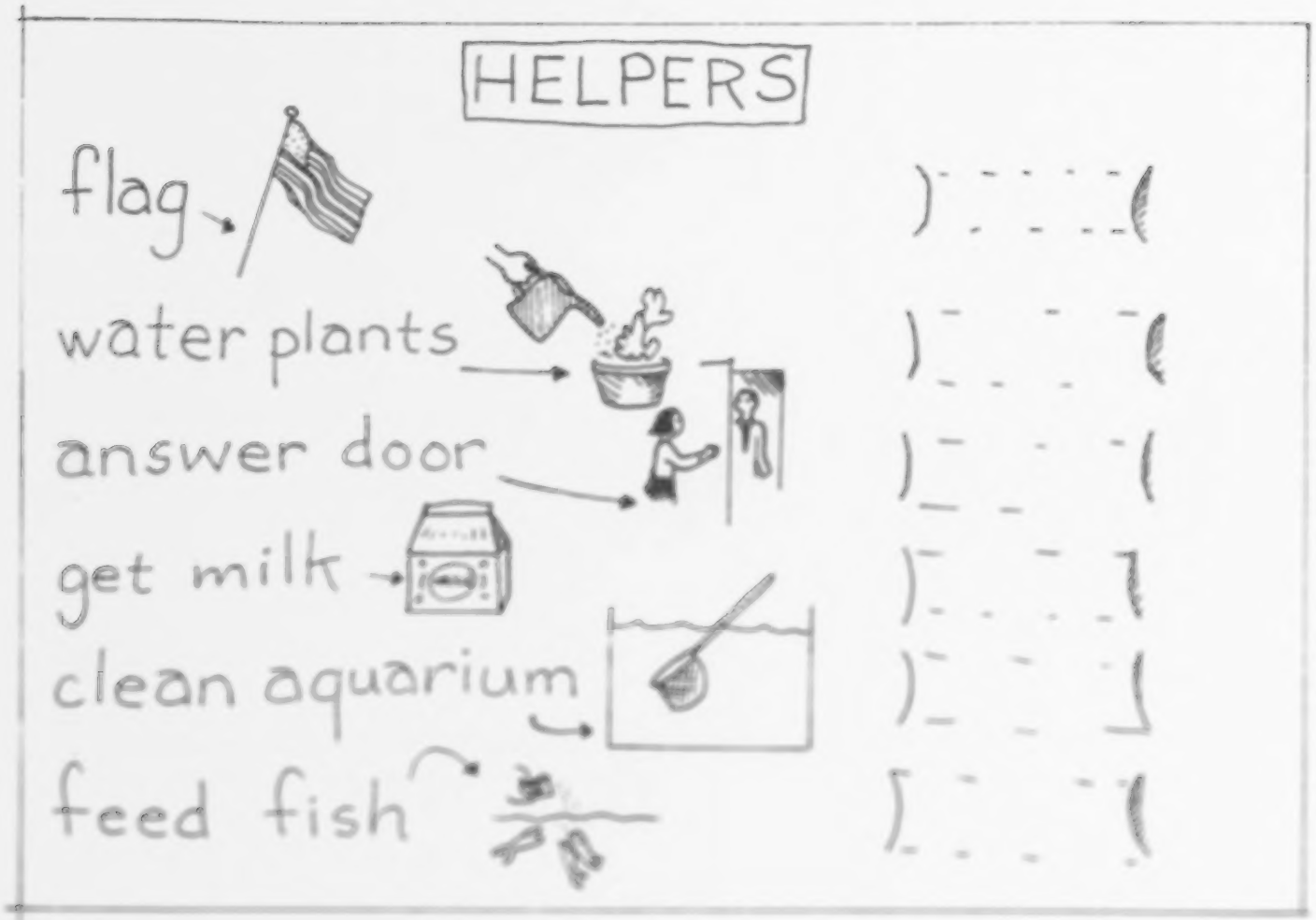
Cat and dog beds can be mde by cutting down cartons and letting cildren sew paddings.

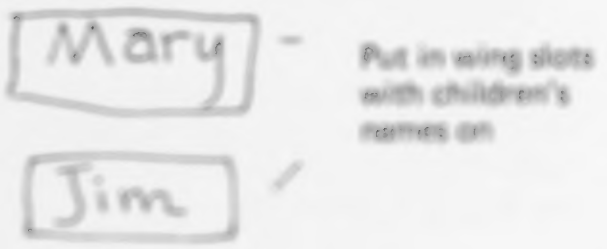
Fish Bowls

Cut folded wax paper in thshape of a fish bowl. Cut fish and seaweedf colored paper. Place them betweentwo sheets of wax paper and press with warm iron.

Windows make a good aquaum. Let children draw goldfish, angfish and other kinds. They cut papeto make seaweed. These were tapedto window panes. Real shells added ione effect.

LEARNING AID NO. 2





LEARNING AID NO. 3

Fingerplay: "There Was A Little Turtle"

"There was a little turtle,	(Make circle with hands)
He lived in a box,	(Make a box with both hands)
He swam in a puddle,	(Wiggle hands)
He climbed on the rocks.	(Climb fingers of one hand up over other)
He snapped at a mosquito,	(Clap hands)
He snapped at a flea,	(Clap hands)
He snapped at a minnow,	(Clap hands)
He snapped at me.	(Point to self)
He caught the mosquito,	(Hold hands up, palm facing forward; quickly bend fingers shut)
He caught the flea,	(Same as above)
He caught the minnow,	(Same as above)
But he didn't catch me."	(Bend fingers only waif way shut)

Seatwork: **Matching Game**

Play matching game in class. Each child has a picture of a pet or a can of pet food. The children with the cans of pet food decide and call together which animal they want. "Where is the *d o g*?" The child with the picture of a *dog* comes up and tried to find the child with the *dog* food. He says, "I am a *dog* . I will eat you." If he is correct, he takes the can of food and the child with the food takes the picture. If he is incorrect, he sits down until he is called on again.

LEARNING AID NO. 4

COLOR WHEEL

Make this color wheel on oak tag. Use primary and secondary colors. Paste a picture of a pet on the wheel of the appropriate color. Put an overlay of a wheel on top of this one with the children's names in each spoke and turn daily. An inch or half inch tack could be put in the middle so it could turn on the bulletin board.

Worksheet No. 1a

HOW PETS SLEEP

Worksheet No. 1b

Worksheet No. 2

OUR PETS

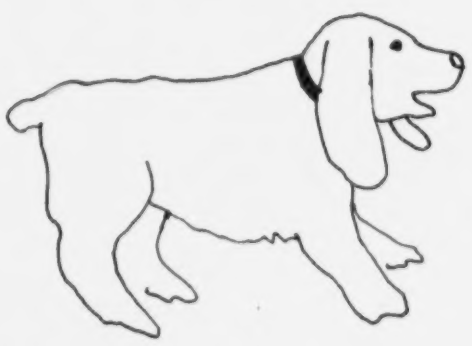
Put an X on Animals That Do Not Make Good Pets

Color Our Pets

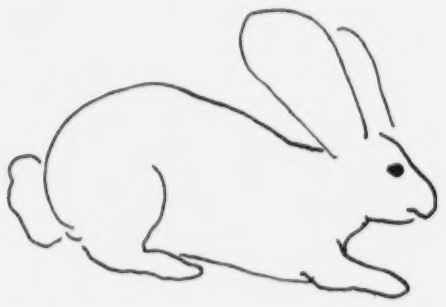
Worksheet No. 3

WHAT AM I?

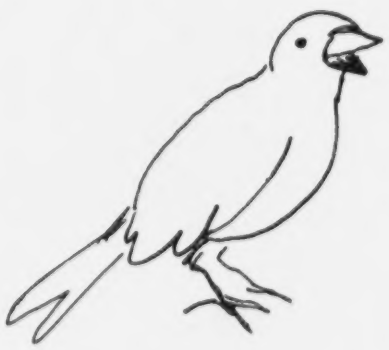
I have hair. I am a _____



I have fur. I am a _____

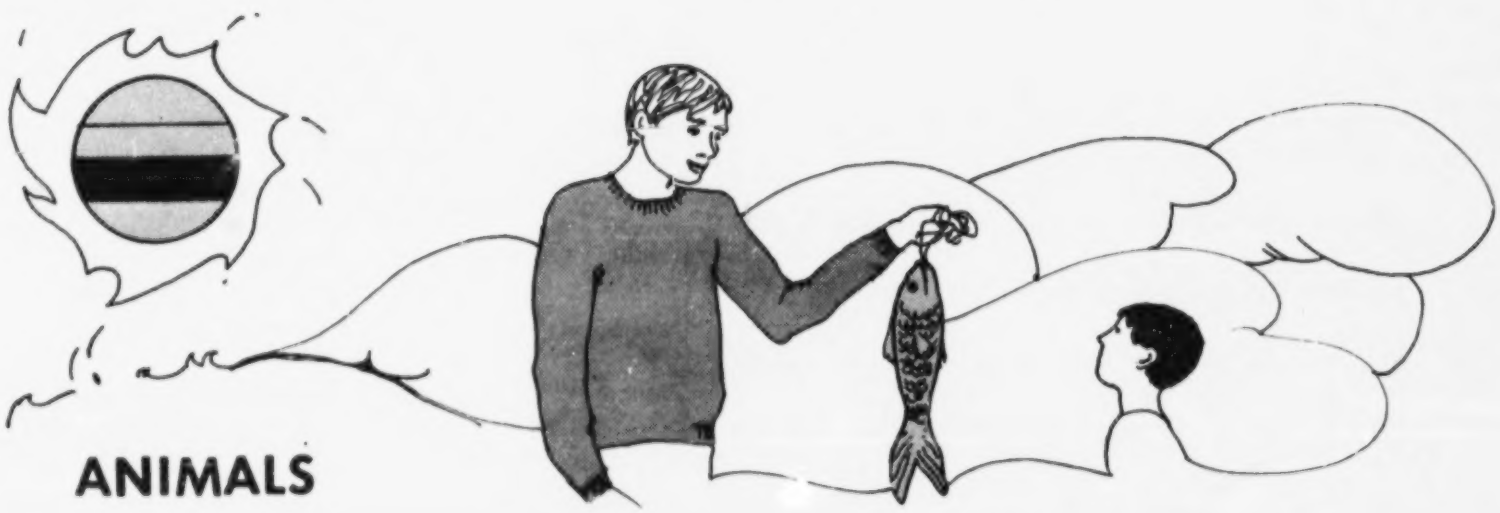


I have feathers. I am a _____



I have scales. I am a _____

INTERMEDIATE LEVEL



ANIMALS

Animal study on the intermediate level, as on the primary, continues to focus on the use of highly motivating subject matter to promote various types of learning. Awareness of characteristics of living things, the interdependence of living things, sensory and perceptual experiences, and experiences in responsibility may be emphasized and reinforced through this area of science.

A listing of specific material to be presented during the teaching of units on animals should contain suggestions similar to the following: *How Animals Help Man, How Animals Protect Themselves, Birds, Insects, Reptiles, Fish, Amphibians, and Mammals.*

General Objectives

To develop through observation and participation, the ability to respond in basic social conversation to:

- Animals as both useful and harmful to man.
- Conservation as related to animal life.
- Simple differences among animal groups.
- Habits of migration and hibernation.
- Relative size of various animals.

To develop ability in relation to:

- Basic habits of conservation as related to animal life.
- How animals are adapted to their environment.
- Characteristics which differentiate major animal groups.
- Feeding and care of domestic animals, fish and birds.
- Recognition of animals used for food and clothing.
- Safety habits to be observed when dealing with animals.
- Vocabulary related to functional learning.

To develop positive attitudes on the part of students which reflect:

- An appreciation of animals as beneficial to man.
- An acceptance of responsibility in relation to animals.
- An appreciation of animals as a source of pleasure.
- Further understanding of the characteristics of living things.

Activities

Initiatory:

Pictures of animals in their natural habitat.

Pictures that emphasize the relative size of animals.

Use of incident involving pet or animal to stimulate.

Purchase and organization of class aquarium or pet.

News story with animal subject to motivate questions and interest.

Assimilating:

Field trips to pet store, farm, exploratory walks for observation of common birds, animals, insects, hatchery, pond, and zoo.

Speakers such as game warden or conservation officer, and officer of Humane Society.

Bulletin boards:

1. Pictures of animals in hibernation, migration, and natural habitat (include different environments).
2. Illustrations of different animal groups.
3. Conservation habits as related to animal life.
4. Baby animals that do not look like their parents at birth.

Related individual and group activities.

1. Seatwork exercises for reinforcement of learning related to grouping, conservation, identification and uses.
2. Experience charts recording learning experiences.
3. Sensory and perceptual experiences in relation to animal characteristics and differences.

4. Animal stories to be read by class and to class by teacher.

5. Experience with hatching eggs.

6. Discussion of observations.

7. Care of classroom pet (s).

8. Project of bird feeding near classroom, if possible.

9. Observation of metamorphosis of a moth or butterfly.

10. Display of materials (fabrics) which come from animals.

11. Student booklet on animals from which man gets foods.

12. Place cut-outs of animals into proper environment represented by background scene on bulletin board or flannel board.

Culminating:

Build a bird or animal shelter where food is deposited and class may observe animals, insects, birds.

Construct an inexpensive aquarium, using a wide-mouth gallon jar, aquarium gravel (or small pebbles collected by students), water plants (elodea, hornwort, or common river plants), snails and goldfish, guppies or river minnows. Experiment to see how much to feed the fish and where to set them to get enough light.

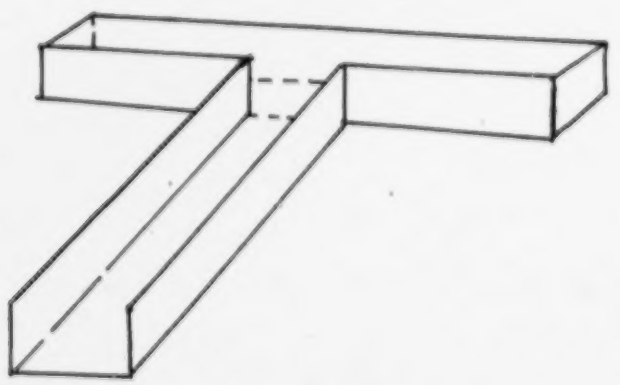
Sample Experiment

Objective:

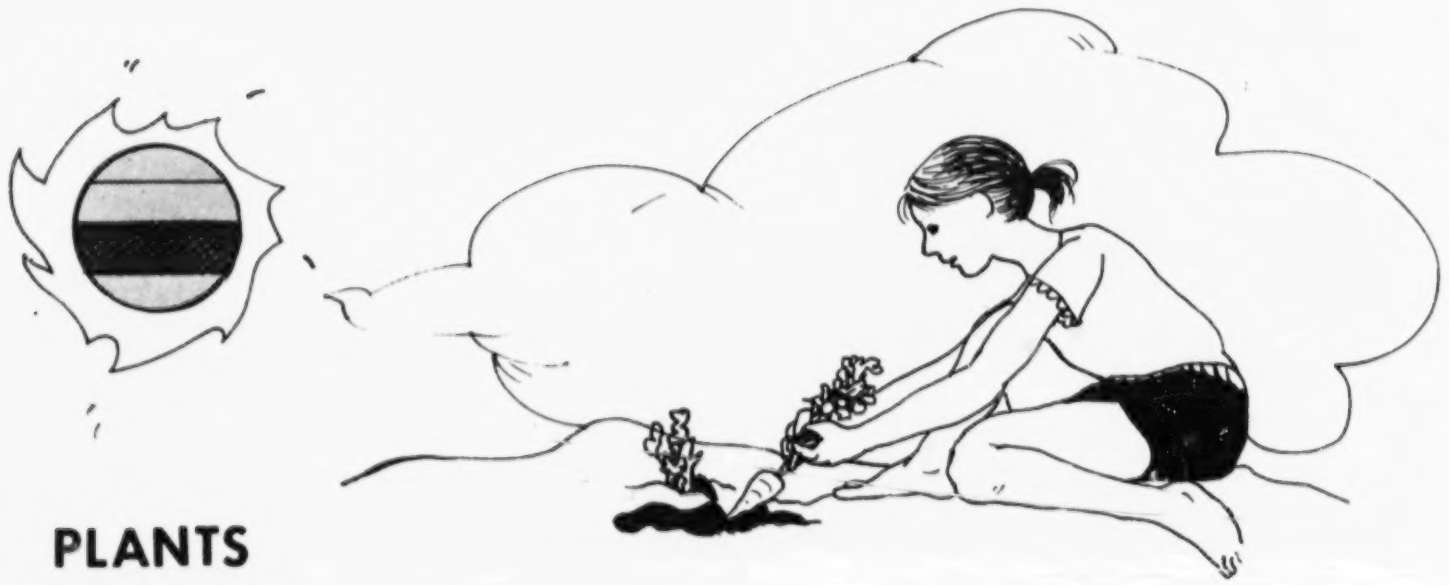
To observe animal reactions to the environment.

Experiment:

Purchase mealworms (not a worm, but larval stage of a grain beetle) from a pet or aquarium shop. Make a T-shaped tube from oaktag or cardboard:



The mealworm is put into the entry to the tube. When it comes to the end of the chute it has a choice of which way to go. Different conditions may be set up at each end, such as different foods, light or dark, cold or warm. The student may record how many times the worms go each way and decide which they prefer. (This may also be done with other harmless insects such as box elder bug.) Note: Mealworms are kept in a container with bran or other cereal, a few crusts of bread, small piece of apple or potato (replace as it dries out) and crumpled paper. Left undisturbed, they will go through their entire life cycle.



PLANTS

At the intermediate level, children should learn to distinguish between kinds of plants, should receive concrete learnings for establishment of the concept of plants as useful to man, and be provided experiences with growing plants. The importance of conservation should be emphasized at this level.

A listing of specific material to be presented during the teaching of units on plants should contain suggestions similar to the following: *Trees and Shrubs, Flowers, Seeds, Vegetables and Other Plants We Eat, and How to Care for Plants.*

General Objectives

To develop through observation and participation, the ability to respond in basic social conversation to:

- The general needs for plant growth.
- The importance of conservation of plant life.
- The varieties and general uses of plant life.
- The fact that plants may grow from different beginnings (seed, root, stem, slip, bulb).

To develop ability in relation to:

- Raising plants.
- Recognizing different forms of plant life.
- Habits of conservation related to plant life.
- Functional vocabulary related to plant life and use.
- Recognition that some plants are edible in their natural state.
- Plants are necessary for the survival of all animal life.
- Plants as providing shelter and food for animals.

- Beauty provided by plants.
- The fact that all seed-bearing plants have flowers.

To develop positive attitudes on the part of students which reflect:

- A positive feeling for work with plants.
- Respect for conservation habits.
- An appreciation of plants as necessary for the survival of life.

Activities

Initiatory:

Take a nature walk to observe and record information about plants.

Provide a variety of plants in the classroom.

Spring garden project.

Bulletin board display posing the question of how a plant grows.

Display labeled parts of actual plants.

Assimilating:

Field trips such as exploratory nature walks to woods, parks, residential areas, greenhouse, garden, vegetable market and nursery.

Speakers such as farmer or gardener, soil conservationist, or florist.

Bulletin boards:

1. Pictures of a variety of trees, names of tree parts, and uses for trees.
2. Samples of shrubs, flowers, and varied types of plant life with examples of their functions.
3. Plants we eat; as they grow and as they are eaten.
4. Collection of seeds contributed by class members.
5. How to care for a lawn.
6. Harmful plants (poison ivy, sumac, briars, etc.).
7. Illustrations of land and water plants.

Related individual and group activities.

1. Experiments with varied plants and effects of different soil, light, air, and water.
2. Experience charts for recording observation, data and experiments.
3. Seatwork related to classification of plants (i.e. plants which are eaten or not eaten, plants used for fabrics, evergreen trees and those which shed leaves, etc.).
4. Display table with a collection of plant parts.
5. Arrange flowers and plants as regular class display.
6. Discuss purpose of flowers, roots and leaves.
7. Read stories and write experiments (according to individual levels).
8. Discuss foods eaten by children and where they originated.
9. Make conservation posters for school display.
10. Learn to identify poisonous plants.
11. Discuss and illustrate how seeds travel.
12. Dramatize a story about a seed as a "hitchhiker" on clothing of passing child.
13. Observe animals gathering food and finding shelter in plant life.

Culminating:

Flower or vegetable garden.

Review experience charts.

Sample Experiments

Objective:

To learn how water gets up to the leaves of plants.

Experiment:

Put a fresh stalk of celery in a beaker of water which is colored with red food coloring. Observe that the water moves up the tubes of the stem into the leaves.

Objective:

To show through experiments that plants cannot live without sunlight, air, or water.

Experiment:

Some plants require less water than others. Some do well in the shade, but it is generally true that plants require all three to survive. Place a potted plant in a dark closet and a similar one in a sunny spot (preferably lima bean plant). Examine them each day. The plant will not live long in the dark. It will grow too fast and lose its color. Plants cannot produce food without sunlight. On a bright day plants often make more food than they need. This surplus food is stored in the roots or other parts of the plant until needed.

Experiment:

Place two potted plants in a sunny spot. Water only one of them. The other will soon die.

Experiment:

Soak three bean or pea seeds overnight in water. Place one of the seeds on moist cotton in a flat dish and keep the bottom moist. Place one in a dish without water. Place the third in a full test tube of water and cork it. Keep all three containers in a warm light place. The seed in the dish with moist cotton will sprout and grow because plants do need air and water. The seed along in a dish had air and sunshine, but not water. The seed in the test tube had water and sunshine, but no air.

WEATHER AND SEASONS

The content in this study on the intermediate level will be similar to that of the primary level. However, the teacher should review and reinforce the concept taught at the earlier level. Forecasting weather for purposes of being prepared in advance should be stressed at this level. Students should form a conscious awareness of the daily effect of weather upon their lives. They should be able to speak of the different seasons with understanding of sequence and the conditions involved. They should become alert to considerations of the effect of weather on planning and in solving life problems, where applicable.

A listing of specific material to be presented during the teaching of units on weather and seasons should contain suggestions similar to the following: *Seasonal Change in Weather, How Man Adapts to Weather Changes, The Weather Report, Precipitation and Dressing for the Weather.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- Changes in weather as caused by heat from the sun, by air, and by water.
- The fact that certain temperatures may be expected at each season.
- The fact that temperature constantly rises and falls.
- Temperature changing during the day.
- The fact that the sun does not heat all parts of the earth evenly.
- Wind as the movement of air.
- Basic concepts of cloud formations.
- Basic concepts of weather forecasting.
- Different types of precipitation (i.e., rain, snow, sleet, etc.).

To develop ability in relation to:

- Reading a thermometer.
- Preparing for seasonal changes.

- Keeping weather records.
- Dressing appropriately for the weather.
- Interpretation of simple weather forecasts.
- The effect of weather upon plant and animal life.
- Recognizing that weather does not always follow a definite pattern, and may often be unpredictable.
- Safety procedures for adverse weather.

To develop positive attitudes on the part of students which reflect:

- A growing interest in, and habits of, weather observation and understanding.
- An appreciation of the way man utilizes his ability to predict weather.
- A deeper appreciation of the effect of weather upon man's activity.

Activities

Initiatory:

Daily assimilation of weather reports from local newspapers, radio, and television.

Display of pictures representing effects of weather conditions (negative and positive representations such as tornado, wind, rain, snow damage, and garden or farm fields with high quality growth).

Discussion of current, local weather conditions and effect upon members of class.

Assimilating:

Field trips to weather bureau, television station, or an exploratory walk for observation of weather conditions and indications of weather's effect upon earth, man-made structures, animals, etc.

Speakers such as weather analyst or radio-TV reporter.

Bulletin boards:

1. Illustrations of weather effects for anticipating certain types of weather.
2. Detailed description of reading an outdoor thermometer.
3. Four seasons theme: illustrate play activities, appropriate dress, types of weather, and plant life.
4. Weather charts developed by class.

Related individual and group activities.

1. Keep a classroom chart to record daily weather changes.
2. Have daily oral interpretation of weather chart by different students.
3. Make illustrations of dress appropriate for various weather conditions.
4. Use experiments to show effects of sun, air, and water.
5. Class experiences in reading and comparing thermometer data.
6. Consider weather conditions when planning class trips or picnics.
7. Read stories telling how animals protect themselves during seasonal changes.
8. Observe clouds, draw pictures of cloud formations and discuss using clouds for weather indicators.
9. Make oral and written reports on characteristics of specific seasons.

Culminating:

Dramatize a radio or television program, incorporating other current studies. Include a weather report to comment on local weather for the day and comparison with class weather record for previous month.

Make a mural representing the four seasons with poster-type explanations for indicated effects of weather on land, man, and animals.

Sample Experiments

Objective:

To show how fog occurs.

Experiment:

Fill two quart milk bottles, one with a cup of hot water and the other with a cup of cold water. Place an ice cube on the openings of each and observe that the fog (water vapor) forms in the one with hot water and not the other. Point out that fog forms when a warm moist mass of air blows over a cool surface of land or water.

Objective:

To show how a cloud is formed.

Experiment:

(Allow various students to experiment) Fill a beaker with cracked ice and hold it under your mouth. Exhale slowly across the top of the beaker and you will see your breath form a cloud. (Students will possibly remark on this occurring when one is outside in very cold weather.)

The cold from the ice condensed the vapor in your breath, changing it to very fine droplets of water. This is the way clouds form.

Objective:

To show how rain and snow come from clouds.

Experiment:

Place ice cubes in a shiny condensed milk can and fill it approximately half full with cold water. Be careful not to get any water on the outside of the can. Watch the outside of the can closely and explain any change. Remind students they have learned from previous experiments that air contains moisture. As the air is cooled the water vapor condenses or changes to liquid which can be seen on the outside of the can. As air is cooled, the moisture in it condenses into small droplets which form clouds. When the droplets become large enough they fall as rain. If they pass through very cold air, they will fall as snow flakes.

EARTH AND EARTH COMPONENTS

While the educable mentally retarded student will not use extensive knowledge about the earth, he should have basic, general facts for ease of comprehension and social interaction. Beyond this, he needs a working knowledge of how man may use water, soil, rock, and air to help him in daily activities. The basic concepts presented in the introductory section should be reviewed and reinforced.

A listing of specific material to be presented during the teaching of units on earth and earth components should contain suggestions similar to the following: *How Man Uses Land, Water: Necessary for Life, Air Is Real, and Earth in the Solar System.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- Primary level objectives for review.
- Conservation as a practice of preserving the earth for man's use.

To develop ability in relation to:

- Caring for land to preserve and use it for the best functions.
- Conservation of water resources.
- Recognition of the necessity of air to life.
- Recognition of different types of earth surfaces.
- Functional vocabulary related to study of earth.

To develop positive attitudes on the part of students which reflect:

- An appreciation of the necessity of conservation practices.
- An awareness of constant change in earth surfaces.

Initiatory:

Display of world globe.

Bulletin board display showing need for conservation.

Field trip observations of soil, rock and water.

Assimilating:

Field trips to a rock quarry or exploratory walks.

Speakers such as soil and water conservationists and a science specialist to discuss earth in the solar system.

Bulletin boards:

1. Illustrations of results of lack of soil and water conservation.
2. Illustrations of various earth surfaces (i.e., mountains, plains, lakes, etc.).
3. Examples of man's use of soil, rock, and water.
4. Illustration of effects of varied degrees of wind (i.e., breeze, wind, tornado).

Related individual and group activities.

1. Use experience charts to record observations and learning about the earth.
2. Observation of rock formations, erosion, cut timber, stream bed.
3. Discussion of how the earth changes, signs of this and how man may use this to his advantage.
4. Observe and discuss man's interference with land (conservation). Pictures of burned or leveled forest, erosion, housing projects, litter on beaches, etc. might be employed.
5. Seatwork related to practices of conservation, differences in earth surfaces, and size concepts of earth.
6. Discuss ways in which class members may practice conservation.

Culminating:

Make booklet of conservation practices.

Review experience charts.

Sample Experiments

Objective:

To demonstrate how wind and water can cause soil erosion and deposition.

Experiment:

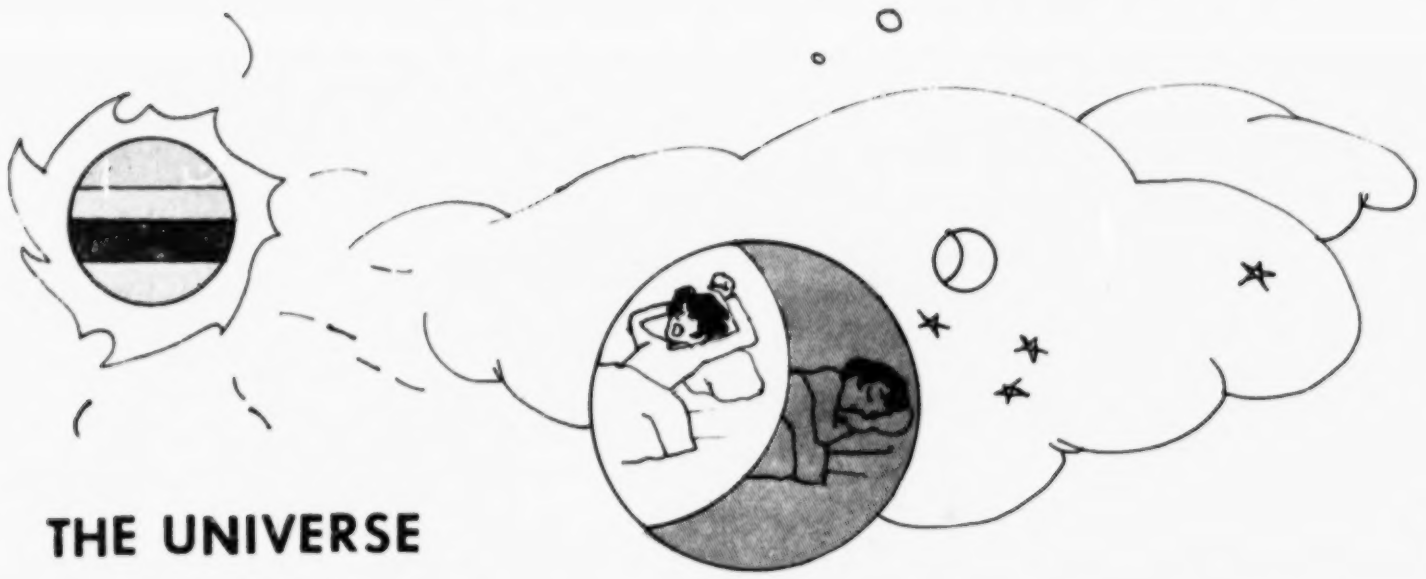
Fill a box half full of dry soil. Turn on an electric fan and hold it over the box. Sprinkle water over the surface. Turn on the fan again and compare results. Repeat the activity using dry sand in another box.

Objective:

To show how ground cover will slow soil erosion.

Experiment:

Use the large pan of dry loose soil shaped into a hill. Cover soil with a piece of sod or with leaves, twigs, and other plant material. Turn the electric fan toward pan of soil. Observe results. Sprinkle hill with water. Discuss the results.



THE UNIVERSE

The basic goals of developing awareness and learning from observations should be continued from the primary level. The teaching of functional information related to realistic life experiences, such as the occurrence of day and night, the actual form of stars, the use of the sun for heat and light, and why there is current emphasis on space travel and study, should be stressed at this level.

A listing of specific material to be presented during the teaching of units on the universe should contain suggestions similar to the following: *Relationship of the Earth, Sun and Moon, The Solar System, Rockets and Satellites.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- Space beyond the earth containing sun, moon, and stars.
- Relative size of sun, moon, and earth.
- Related movement of sun, moon, and earth.
- Man's use of light and heat from the sun.
- The causes of day and night.
- Man's interest in space and its exploration.

To develop ability in relation to:

- Observing natural phenomena for reinforcement of learning.
- Basic vocabulary related to the study of the universe.
- Wise use of sunlight and heat.
- Estimating size in relation to distance.
- Basic information on current space programs.

To develop positive attitudes on the part of students which reflect:

- An appreciation of the relationship between the earth and the sun.
- An appreciation of the fact that the sun is the main source of energy.
- An appreciation of beauty as provided by the universe.

Activities

Initiatory:

Use of current news of space program to stimulate interest.

Bulletin board displays of the moon, the sun, path of moon and sun around earth.

Discussion of weather to initiate curiosity and interest in the sun.

Discussion of the sun as a source of energy.

Assimilating:

Field trips for outdoor observations of visual effects of sunlight and planetarium or telescope (if night trip is possible).

Speakers such as a person with hobby of star observations or science specialists.

Discussion of eclipses.

Bulletin boards:

1. Solar system.
2. Eclipses of moon and sun.
3. Accounts of space shots.

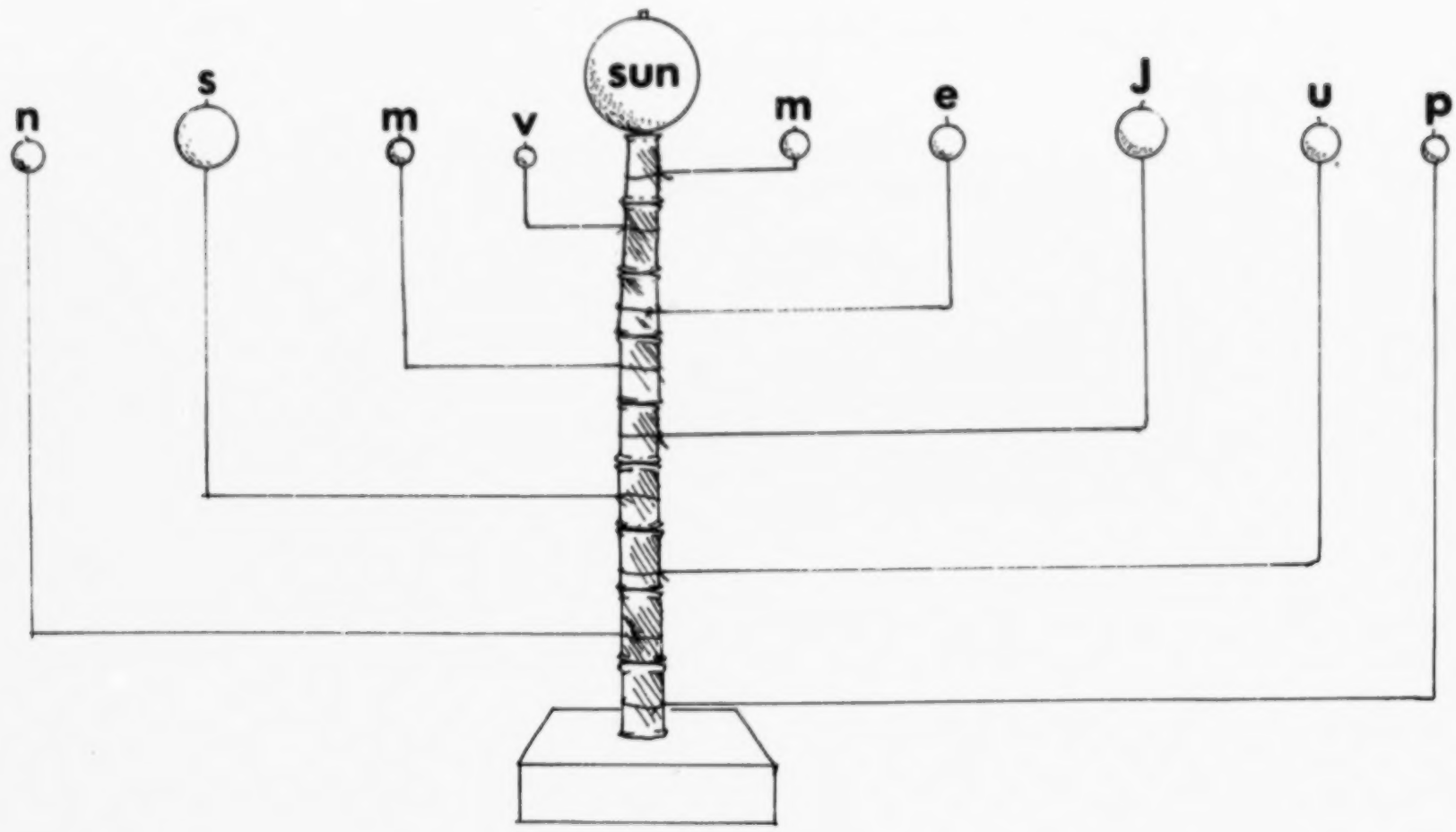
Related individual and group experiences.

1. Experiments showing movement of earth in relation to sun.
2. Experience chart accounts of study of the universe.
3. Observations of length of daylight from one day to another.
4. Recognition of names and positions of planets in the solar system.
5. Make a chart of the ways in which man uses the sun's heat and light.

Culminating:

Review experience charts.

Construct a model of the planets in the solar system (see below).



This model is constructed by nailing a piece of dowel to a base and stringing it with empty thread spools. Using plastic or paper spheres to represent the planets, attach them to wire bent at right angles to form the radius of the orbit. Twist the remaining end of the wire around the appropriate spool.

Sample Experiments

Note: Experiments listed for primary level may be reviewed. If any student recalls experiments, allow him to demonstrate for class.

Objective:

To show that the sun gives us light and heat.

Experiment:

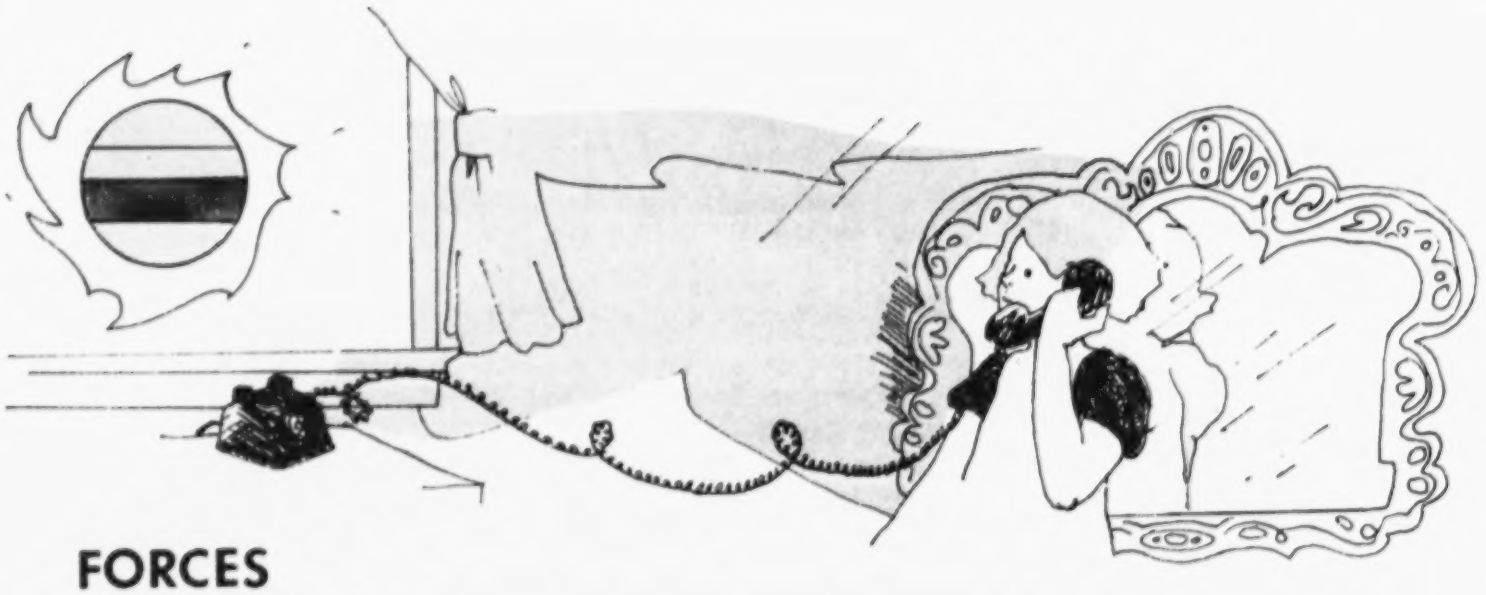
Use a hand lens to focus light. Feel the heat. Pull the shades down. Feel the difference in temperature in sunlight and in the shade. Observe the difference in light.

Objective:

To show that dark colors absorb light energy (heat from the sun) more than light colors.

Experiment:

Use a child's dark shirt or sweater and a white shirt to wrap around separate thermometer bulbs. Record temperature of each in ten minutes.



FORCES

Study of forces at the intermediate level will add the concept of gravity to the subject areas covered on the previous level. The opportunity for functional teaching is extensive in these subject areas. They correlate highly with experiences in the home and will relate to later vocational situations. For these reasons, highly motivational activities should be provided and a variety of teaching approaches employed. Although it is suggested that specific units be taught along the study of forces, a teacher should find many opportunities for reinforcement of desired objectives through incidental learning and through Life Experience Units or other topics.

A listing of specific material to be presented during the teaching of units on forces should contain suggestions similar to the following: *Electricity, Using Sound to Help Us, Simple Machines, Telephone, Tools, Magnetism and Gravity.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- The fact that sound travels from one place to another.
- The fact that sound is used to a great extent by man.
- The fact that there are several causes for fire and heat.
- Heat used for many purposes.
- How electricity is used to help man.
- Gravity as a force which pulls objects towards earth.
- Responsibility and value attached to experience with machines.
- Illustrations of simple machines (i.e., lever, wheel, axle, pulley).

To develop ability in relation to:

- Using forces to accomplish work in a more efficient manner.
- Safety in relation to fire and electricity.

- Using sound for more awareness of environment.
- Care and basic skill in handling tools and simple machinery.
- Vocabulary related to study of forces.

To develop positive attitudes on the part of students which reflect:

- An acceptance of force as a necessary part of work and play.
- An appreciation of the importance of safety in relation to forces.
- An appreciation of machines as useful to man and worthy of care.

Activities

Initiatory:

Display of sound and communication equipment.

Bulletin board representation of historical account of man's use of fire.

Display of magnets.

Fire Prevention Week preparation.

Discussion of sounds.

Display of simple machines.

Assimilating:

Field trips or exploratory walks for observation of sound (cars, planes, animals, wind), machinery, and use of heat.

Speaker such as fireman to give functional talk on how fire, water, and machines affect his and students' lives.

Bulletin boards:

1. Fire safety.
2. Safety with electrical outlets and appliances.
3. Examples of uses of electricity.
4. Examples of kinds of heat (i.e., sun, gas, electric, coal, etc.).
5. Pictures of machines.

6. Pictures of different types of magnets.

7. Posters on telephone communication.

Related individual and group activities.

1. Experience chart accounts of observations, discussion and experimentation.

2. Seatwork related to effect and use of forces.

3. Experiments to show that sound travels.

4. Experiments with magnets.

5. Charts of safety factors related to fire and electricity for use in students' home.

6. Telephone usage.

7. Projects using tools, simple machines with stress on safety and proper care.

8. Experiments showing the effects of the force of gravity.

9. Basic study of common machines used in home (vacuum cleaner, sewing machine, lawn mower, power tools, etc.).

10. Discuss sounds meaningful to students (i.e., siren, fire bell, telephone bell, ice cream man, church bell, etc.).

Culminating:

Review experience charts.

Display of projects made in study of tools.

Sample Experiments

Objective:

To show that sound travels through solids.

Experiment:

Strike a tuning fork and hold it in the air. Now strike it again and touch the stem to a door panel or a window pane. It seems louder when transmitted by wood or glass.

Objective:

To understand that a lever is a bar or pole that can help move or lift things.

Experiment:

Have children see-saw with other children of various weights, then with the teacher. Guide children to discover if the teacher moves closer to the teetering point, he can be lifted.

Objective:

To learn that a pulley makes it easier to lift heavy objects or get things to high places.

Experiment:

Observe raising of flag on an outdoor flag pole. Explain to the children how difficult this would be without the pulley. Have them think of heavy objects which could be lifted by this method. (i.e., paint-filled buckets, bricks for construction, etc.)

HUMAN BEINGS

The development of a positive self-image is of prime importance to the retarded individual. Basic to the psychological and emotional aspects of this development is understanding and acceptance of the body and its physical relationship to the environment. The mentally retarded need guidance in perceiving this interaction of the human and the physical environment. Practice in cause and effect reasoning is of value in decreasing their specific learning disabilities.

Basic understanding of body functions and parts should be taught for the purposes of establishing proper health and safety habits and the reduction of frustration in life situations dealing with natural phenomena.

A listing of specific material to be presented during the teaching of units on the human should contain suggestions similar to the following: *Man As An Animal, Human Needs, The Sense Organs, and Body Systems.*

General Objectives

To develop, through observation and participation, the ability to respond to basic social conversation to:

- How man adapts to his environment.
- The human body containing various systems to help it to function.
- Man's dependency upon certain factors of his environment.
- Human needs for existence.
- What distinguishes man from other animals (i.e., intelligence, upright posture, articulate speech).

To develop ability in relation to:

- Establishing habits for most effective adaptation to environmental conditions.
- Good health habits.
- Recognition of some signs of ill health.
- Sensory experiences.
- Functional vocabulary related to the human body.

To develop positive attitudes on the part of the students which reflect:

- An appreciation of man as distinguished from other forms of life.
- An appreciation of the necessity of proper body care.
- An appreciation of both functional and aesthetic properties of the sense organs.

Activities

Initiatory:

Bulletin board and poster displays to motivate interest in:

1. Man's adaptation to natural environment.
2. How man meets his needs for survival.
3. Use of sense organs.
4. Body Systems.
5. Safety habits.

Discussion of daily activities of individual class members for comparison of:

1. Meeting life situations.
2. Health habits.
3. Use of sensory organs.

News item relating survival of individual (s) in unfavorable situation (extreme cold, floods, snowstorm, tornado, etc.).

Socio-drama with situation of unfavorable weather or lack of usual materials for meeting human needs. Direct students to act out what they might do to overcome such a situation.

Assimilating:

Field trips such as exploratory walks to observe (with teacher guidance) evidence of how man adjusts environment to his needs (buildings for shelter, gardens for food, pipes for carrying water, windows for light and air, clothing for protection, cars for transportation,etc.).

Speakers such as school nurse, dentist, and physician.

Bulletin boards:

1. Note: See suggestions under Initiatory Activities.
2. Posters on sense organs.

3. Illustrations of body uses of food (heat, growth, repair).

4. Comparative illustrations of environmental adjustments by early man and those of modern man.

Related individual and group activities.

1. Discussion of man as an animal, with similar needs, less physical strength than some, but superior intelligence which ranks him above others.

2. Experience chart on man as a mammal (list characteristics of: (a) Covering of fur or hair; (b) Mamary or milk glands to provide nourishment for young.

3. Seatwork on health habits, safety in relation to body parts, use of sensory organs, and ways to adjust in unfavorable situations.

4. Games utilizing sensory experiences.

5. Booklet of basic human needs and how they are met (air, food, water, protection from elements).

Culminating:

Posters (for display) on "How I Keep My Body Healthy."

Essays on pleasant sensory experiences.

THE ENVIRONMENT

As the word environment encompasses so much, this section may be used to integrate and revise many of the concepts previously introduced to the pupils. Here perhaps more than anywhere else, the impromptu teaching situation should be fully utilized.

At this level the emphasis has been placed on ensuring that the student is aware of the concept of environment and environmental adaptation. As he develops this awareness the educable mentally retarded child must also develop a sense of personal responsibility (i.e., correct disposal of litter, care of trees and flowers, etc.) for this environment and this theme should always underlie the teaching of the unit.

A listing of specific materials to be presented during the teaching of units on environment should contain suggestions similar to the following: *Contrasting Environments, Environmental Adaptations and Conservation.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- An awareness of the concept of environment.
- The fact that environmentental changes will affect living things.
- The fact that environment may be changed by living things.
- The fact that man can create or destroy an environment of beauty and utility.

To develop ability in relation to:

- Recognition of different environments (i.e., deserts, jungles, ice caps, etc.).
- Recognition that plants and animals adapt to environments in different ways.

To develop positive attitudes on the part of the students which reflect:

- Appreciation of the importance of environmental adaptations.
- Awareness of the individual and community responsibility in caring for their immediate environment.

Activities

Initiatory:

Discussion of what an environment is (i.e., the place where any plant or animal lives is called its environment).

Field trip to observe the environment of animals and plants (i.e., woods, open spaces, streams, etc.).

Stories about children who live in environments different to that of the pupil's (i.e., eskimos, desert dwellers, etc.).

Assimilating:

Field trips to contrasting environments (i.e., the center of a city or town, a park, a farm, a natural bush area).

Speakers such as a conservation officer and a city planner.

Bulletin boards:

1. Pictures of contrasting environments.
2. Pictures showing different types of housing and the environment to which they are suited.
3. Pictures showing different types of clothing and the environment to which they are suited.
4. Pictures of extinct birds and animals.

Related group and individual activities.

1. Revise and if necessary, repeat experiments showing how plants need light, air, water, etc.
2. Revision of the needs of plants and animals.
3. Discussion of how these needs are met in contrasting environments.
4. Collection of different materials in the immediate environment. Go on a "treasure hunt" in a park and organize the results into two groups—those which are indigenous to the area (rocks, plants, etc.), and those which are not (paper, tin, bottles, etc.). Use this to initiate discussion of the problem of litter.
5. Seatwork listing the plants and animals with which the pupils share their environment.
6. Experiments showing how environment may be changed by natural forces (i.e., wind, water, etc.).

7. Compare the type of clothing offered for sale in a winter and summer mail order catalog. Discuss the reasons for the differences.

8. Discuss why birds and animals migrate and hibernate.

9. Discussion of extinct birds and animals, stressing the reasons why they became extinct.

10. Revise the ways in which each pupil can practice conservation.

Culminating:

Select an area in the local community and discuss how the pupils feel it could be improved (i.e., by planting shrubs, painting buildings, etc.).

Sample Experiments

Objective:

To show that some plants could not live in a desert.

Experiment:

Take two bean plants in pots of sandy soil. Place them in the window to get sunshine. Water both of them. Continue to water one plant every two days, and do not water the other. Observe for two weeks and note the results.

Objective:

To observe how some plants adapt to their environment.

Experiment:

Compare the leaves on a garden plant with those of a cactus plant. Cut the leaves and stems of both plants observing and noting the differences.

Suggested Resource Materials
Intermediate Level

Banks, M. A., *How we get our dairy foods.* Chicago: Benefic Press, 1964.

Branley, F. M., *A book of astronauts for you.* New York: Thomas Y. Crowell, 1963.

Branley, F. M., *A book of plants for you.* New York : Thomas Y. Crowell, 1961.

Bulla, C. R., *A tree is a plant.* New York: Thomas Y. Crowell, 1960.

Carter, K., *The true book of oceans.* Chicago: Childrens Press, 1958.

Darby, G., *What is a butterfly?* Chicago: Benefic Press, 1958.

Freeman, M. & I., *You will go to the moon.* New York: Beginner Books, Inc., 1959.

Gibson, G. H., *About our weather.* Chicago: Melmont Publishers, Inc., 1960.

Knight, D. C., *Lets find out about weather.* New York: Franklin Watts, Inc., 1967.

McCabe, S. A., *How communication helps us.* Chicago: Benefic Press, 1964.

McCall, E. S., *How we get our cloth.* Chicago: Benefic Press, 1964.

Schneider, H. & N., *How big is big?* New York: William R. Scott, Inc., 1946.

Selsam, M. E., *Benny's animals.* New York: Harper & Row, 1966.

Selsam, M. E., *Play with planets.* New York: William, Morrow & Co., 1958.

Selsam, M. E., *You and the world around you.* Garden City, New York: Doubleday, 1963.

Filmstrips

Order from: Eye Gate House, Inc.; 146-01 Archer Avenue; Jamaica, New York 11400.

Series: *The American Farmer and Our Food Supply*

54A The American Farmer
54B Animals on the Farm
54C Machines on the Farm
54F Dairy Farming
54G Cattle Raising
54H Fruit Farming
54I Truck Farming

Series: *The Story of Transportation*

49A Transportation on Foot
49B The Wheel in Transportation
49C Animals in Transportation

49E Roads, Bridges, and Tunnels
49G Transportation by Water
49H Transportation in the Air
49I Modern Land Transportation

Series: *Fundamentals of Science Grades 3–4*

119A A Visit to the Weather Station
119B Weather Maps and Weather Forecasting
119C All Kinds of Weather
119F Our Earth Is Part of the Solar System
119G Simple Machines
119H Machines Help Us Travel

Series: *Science in Everyday Life*

43A Water and Its Importance
43C Soil and Its Uses
43D The Sounds We Hear
43F What Makes the Weather
43G Machines for Daily Use
43I The Stars In the Sky

Teaching Transparencies

Order from: Instructo Corporation; Paoli, Pennsylvania 19301.

Series: *The Earth and Sky 807–A*

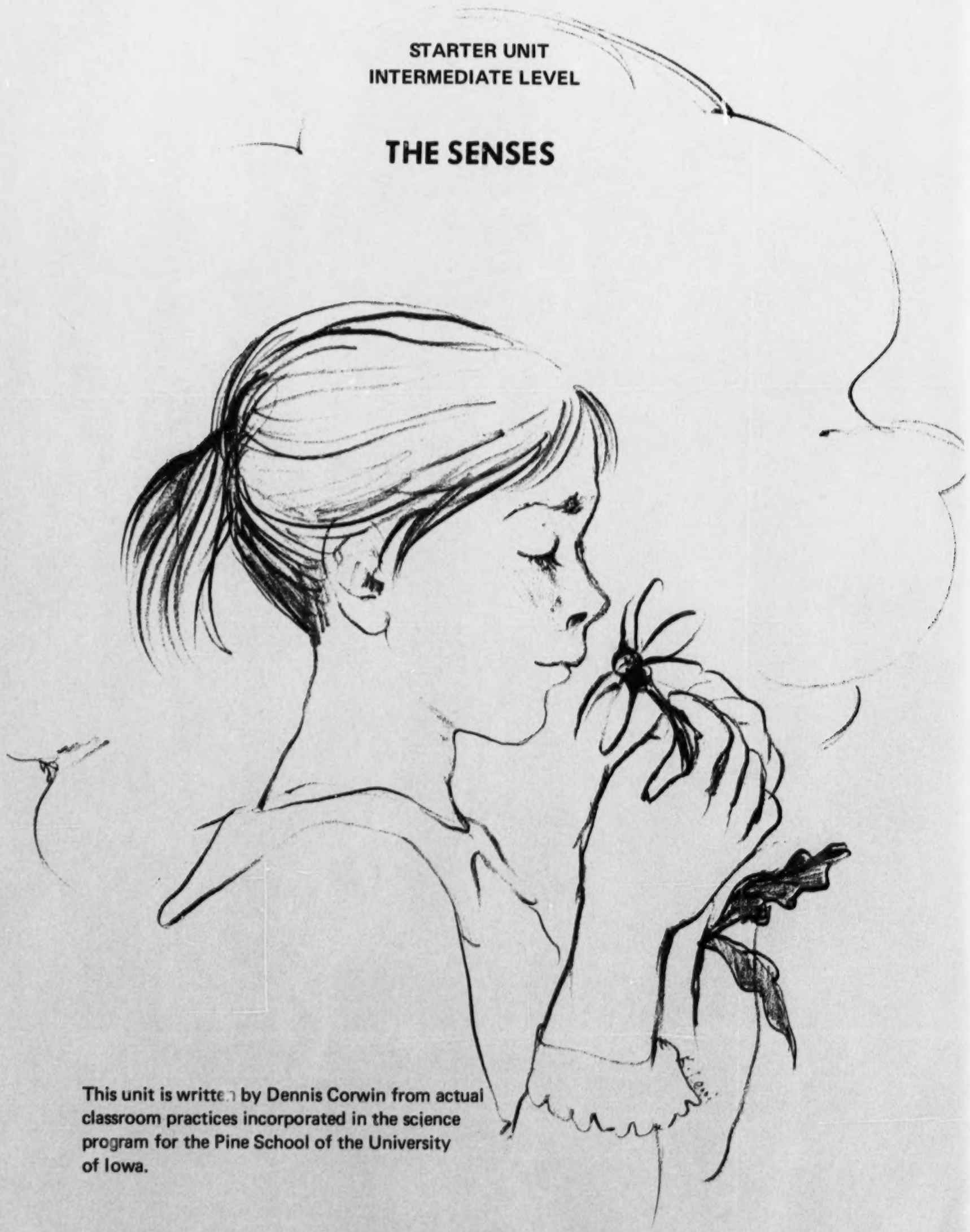
807-1 What Is Day? What Is Night?
807-9 Learning About Light and Shadows

Series: *Animals 814–A*

814-1 I Have Fish (Basic Needs of Fish)
814-3 I Have a Rabbit (Basic Needs of Rabbits)
814-8 How Chicks Develop and Hatch

STARTER UNIT
INTERMEDIATE LEVEL

THE SENSES



This unit is written by Dennis Corwin from actual classroom practices incorporated in the science program for the Pine School of the University of Iowa.

THE SENSES

Rationale

Children use their senses every day to find out about the world around them. The mentally retarded child must rely heavily upon the senses for information about his environment. However, the ability to use the senses discriminately is often not well developed. Use of the senses to perceive the environment accurately is a skill that needs constant guided development. This unit should stimulate a keener awareness of the child's environment, develop a better vocabulary to communicate with others, and improve discriminate use of the senses. Guided sensory experiences should never begin and end with a single unit, but should be incorporated as often as possible into all of the learning experiences of the child.

Sub-Units

Weather Reporting	Money	Home Safety	Sense Organs
Helpful Sounds	Plants	Clothing	Animals

General Objectives

To develop better communication and observation.

To develop better understanding skills.

To become more aware of the use of the sense of touch.

To become more aware of the sense of taste.

To become more aware of the use of the sense of smell.

To learn the importance of using as many senses as possible.

To learn that the senses are limited and can give wrong information.

To learn that special instruments are used by scientists to improve the use of the senses.

Core Area Activities

Arithmetic Activities

Counting objects.

Estimating numbers of objects in a box.

Count time periods in games.

Recognizing specific coins.

Compare sizes.

Add number of objects passed out to class.

Use calendar and thermometer for keeping weather account.

Measure teaspoon of jam.

Measure sugar for making Kool-Aid.

Distinguish between few and many (i.e., grains) when experimenting with solids.

Use pan balance.

Distinguish between coins used in experiments.

Social Competency Activities

Ask and answer questions.

Observe external stimuli more closely.

Use senses more often and more accurately.

Take turns in class activities.

Distinguish right and left.

Communicative Skills Activities

Write experience charts.

Read posters, charts, books on use of senses.

Ask and answer questions.

Learn to describe objects accurately.

Dramatize a short story.

Make a bulletin board display.

Match descriptive words with objects.

Learn directions.

Write accounts of sensory experiences.

List and name purposes of sense organs.

Give oral reports on experiences with senses.

Distinguish between ease of reading small letters and large letters.

Discuss care of the sense organs.

Keep weather record.

Safety Activities

Practice in observing for objects or exit routes for use in emergency situations.

On field trip, pick up harmful objects which may clutter school yard.

Learn caution and proper method for handling sharp-pointed objects.

List or draw pictures of objects which may be dangerous to touch.

Discuss and draw illustrations of dangers of tasting unknown substances.

Use experiments to learn to recognize odors which might signify danger, such as fire.

Display and learn to recognize symbol for poisonous substances.

Use caution in mixing chemicals which might be harmful.

Observe visual distortions possible under water for safety in diving and swimming.

Practice habits of using vision for safety in bicycle riding.

Learn and practice safety habits for protection of the sense organs.

Health Activities

Discuss and draw pictures of proper dress for varied types of weather.

Learn to recognize liquids and solids which might be harmful to the health if swallowed.

Discuss good health habits related to the sensory and nervous systems.

Vocational Activities

Relate development of more accurate use of sensory organs to manipulation of machinery, reflex action, etc., important to vocational competency.

Practice following directions.

Point up safety activities in relation to job safety.

List jobs which require specific use of senses.

Learn to keep records.

Resource Materials

experience chart—tablet, magic markers, pictures, easel

bulletin board

charts and posters

calendar

thermometer

tape recorder

shoe box

containers such as plastic refrigerator bowls

small objects of varied shape

small cardboard box

powdered and granulated substances

pictures

films

salt, sugar, vinegar, coffee, rubbing alcohol, lye

pieces of cloth of varied textures

toothpicks

water glasses

coins

orange juice cans

magnifying glass

fruits and vegetables, vanilla, Kool-Aid, jam

microscope

styrofoam block

steel ball

pan balance

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS
To develop better communication and observation.	Ask questions to stimulate an interest in observing such as: Was the sky cloudy or clear? Which way was the wind blowing? What color is the front door of the building? Without looking, how many windows are there in the classroom? etc.	
	Put a group of 10–15 familiar objects under a sheet of newspaper. Explain to the children that they will only be able to look at the objects for a short time, but they are to observe quickly and try to remember as many as they can. Lift the paper for 5–10 seconds. Stimulate a competitive spirit and recognize the "champion observer." This can be repeated throughout the unit using different kinds and numbers of objects and different observation times. Look for individual improvement from week to week as a measure of progress.	Objects familiar to the students
	A variation of the game Twenty Questions can be played with a student or team of students selecting a visible object in the room which other students must identify by asking questions having yes or no answers. Recognize good questions on the part of the students and guard against making conclusions too rapidly without having sufficient information.	Objects in the classroom
	The students should become more precise in describing objects and better at asking the right kinds of questions when they have had more experience with this type of activity.	
	Have a small group of students perform a short play without words. Ask questions of the class such as: Who entered the room first? What did Jim take out of his pocket? What color was Jane's dress? Point out to the class that similar problems exist when people observe crimes or accidents.	
	Ask students without looking to tell where certain objects are located in the room or school building.	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS
To develop better understanding skills.	Make a tape recording of sounds in the classroom. Play the tape back to the class and see if they can identify the sound and where it came from.	Tape recorder
	This could also be done with tapes of animal sounds, danger sounds, sounds of machines, etc.	
	Put one or more objects in a closed shoe box. Have students shake the box. Describe the sound. Can you tell what shape the object is. Try more than one object and see if the children can tell how many objects there are in the box.	Shoe box Various small objects
	Use a penny or nickel, dime and quarter. Do not let the children see while you drop one. See if they can tell by the sound of the impact which one is dropped.	
To become more aware of the use of the sense of touch.	Use an "Object Box" or "Mr. Touch" box. Put objects in a a container such as a shoe box with a hole in one end just large enough for the students to get their hands in. The hole can be covered with a cloth flap. Have the students put their hand in and try to identify the object by touch. Sandpaper, velvet, rubber, leather, ice cubes, orange, apple are interesting things to put in the box.	Small cardboard box
	Put samples of powdered and granulated matter in containers which are unmarked and a similar set of samples in containers which are marked. Blindfold the students and have them try to match the samples: Use as many descriptive words as possible to describe the differences in feeling of the different substances. Sugar, salt and flour are three good substances to use.	Containers, powdered and granulated material.
	Take a field trip around the school yard. Collect such things as bark, stones, twigs, leaves, grass, etc. Make a bulletin board display with the objects grouped according to similarities and differences of feeling.	Bulletin board Descriptive words printed on cards.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS
	The class could also try to match descriptive words, printed on cards, with the objects.	
	Have a student put his arm out to one side so that he can't see it Don't move the arm or hand at all. Ask him to describe his arm by answering these questions: Is the arm straight out, slanted or bent? Which direction? Which direction is your hand pointed? Is your palm facing up or down? Are your fingers straight or bent?	
	Have the students gently press the point of a pencil onto their fingertips. After they have done this a few times, have them turn the pencil around and press the finger with the eraser end. Describe the differences in feeling. Blindfold students and see if they can tell the difference between a sharp pencil point touching the fingertips lightly and a blunt eraser touching it lightly.	
	Have pictures of things that might be dangerous to touch, such as a radiator, fan, oven burners, etc. Discuss dangers and reasons for them. The pictures could be used as a bulletin board display.	Pictures of dangerous things to touch. Bulletin board.
	Give the students pieces of cloth of various textures. Describe the difference in touch. Discuss which would feel best to wear. Which would be best to wear in summer, in winter?	Pieces of cloth of various texture.
To become more aware of the sense of taste.	Have some salt, sugar, vinegar, and instant coffee, some toothpicks and two glasses of water. Wet the toothpick and apply one of the materials to one spot on the tongue and then to others (tip, sides, back). Give students a drink of water each time to clear the taste buds.	Salt, sugar, vinegar, coffee, toothpicks and water.
	Discuss dangers of tasting unknown materials. Harmful materials in the home such as medicines, cleaning compounds, etc. Dangers outdoors, berries, plants, etc.	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS
To become more aware of the use of the sense of smell.	If there is a cafeteria in the school, have the students smell and try to decide what is being served for dinner.	
	Make some different odors in the room out of the children's sight and see if they can identify them (burning bread or rubber, ammonia, vinegar, pine needles). Relate this activity to using the sense of smell for safety. (Detecting fire, harmful materials to taste, etc.).	
	Put water, rubbing alcohol, and white vinegar in three glasses. Ask the children what they think is in the glasses. Let them smell each. Relate to dangers of tasting anything without knowing what it is even though it looks safe.	Glasses, water, white vinegar, rubbing alcohol
	Put something such as an orange peeling in a cardboard box with a few small holes in it. Have the students see if they can identify the contents by just smelling. Use other things, such as onion peelings.	Cardboard box
To learn the importance of using as many senses as possible.	Pass out some objects, one to each small group of children. Have them use all of their senses to observe the object. Have different students describe their object and see if the others can figure out what it is.	
	Give each student a pile of salt, sugar, and starch. Describe the visual appearance, feel, sound when rubbed on paper, odor and taste. Caution against tasting or touching without knowing for certain that it is safe.	Salt, sugar, flour and lye
	Use some granulated lye, mix with some water in a glass container. Let the children feel the container, it should get hot.	
	Have the children describe the weather conditions each day using as many senses as they can.	
	Make a bulletin board with large cutouts of the body that are used to sense, show how they are used.	Bulletin boards, cutouts of the senses

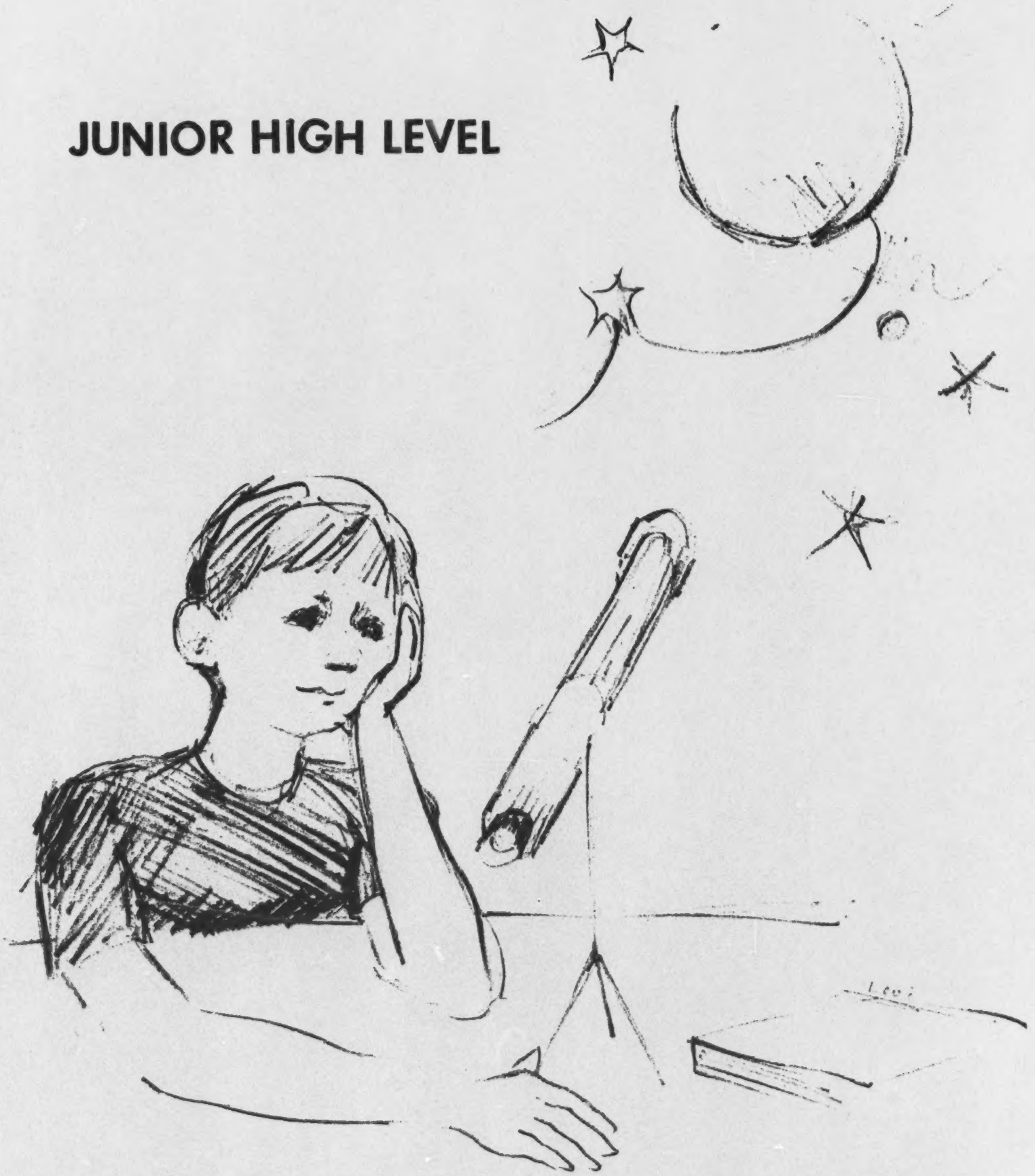
OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS
To learn that the senses are limited and can give wrong information.	Put a coin in the bottom of an empty coffee cup. Have the viewer stand so that he cannot see the coin. Slowly pour in water and the coin comes into view.	Coin, cup, water
	Put a pencil in a glass of water. The pencil appears to be in two parts as the water bends the light. Relate to dangers in diving, when swimming, an object under water may not be in the exact place it appears to be.	Pencil, glass, water
	Have a student look straight ahead into the eyes of another student. Move an object up behind him at eye level. Ask him to signal when he can see it. Drop the object, marking the spot where it hits the floor. Relate to importance of turning the head and looking in both directions when crossing a street, riding a bicycle, etc.	
	Cut the bottoms from two orange juice cans. Have students walk using the tin can "eye-glasses." Have them observe and describe the usual effects.	Orange juice cans
	Use an adjustable speed phonograph to vary the time available to look at information printed on a small card mounted in a cork on a small motion picture reel. At a given speed is it easier to see large letters than small letters? Does the contrast between the letters and background have an effect? Change the amount of light in the room and the distance between the observers and the letters. Relate the results to reading comfort. Adequate lighting, size of type, color of paper, etc.	
	Discuss the purpose and importance of wearing glasses if it is necessary.	
	Apply sugar to parts of the tongue other than the tip to show that certain regions of the tongue are only sensitive to certain tastes.	Sugar
	Dry the top of the tongue and apply sugar. Can you taste the sugar as long as the tongue stays dry?	

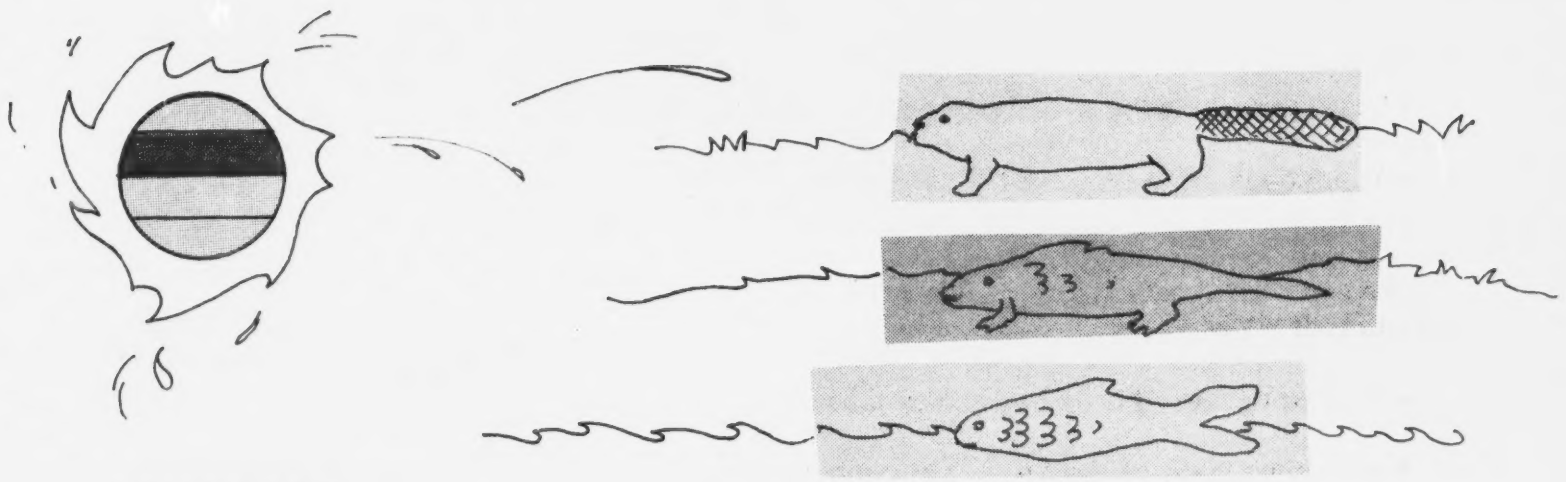
OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS
	Have a child blindfolded and plug his nose. Feed him bits of raw fruit and vegetables. Can he distinguish what he is eating?	Fruits and vegetables
	Blindfold a student and put some vanilla under his nose. Tell him you will take it away and he is to tell you when. This shows how soon the nerves of smell get tired.	Vanilla
	Make some Kool-Aid, sweetened to taste. Then eat a teaspoon of jam. Now drink some more Kool-Aid. Does it seem as sweet?	Kool-Aid, jam
	Use pictures of wild and tame animals to compare their sense of smell with that of humans.	Pictures: *Wild Animals,* M. A. Donohue & Co. *Amphibians, Reptiles, Mammals, Fish & Insects,* SVE Co.
To learn that special instruments used by scientists can improve the use of the senses.	Using a magnifying glass or low-power microscope study a few crystals of table salt, sugar, and epsom salts. Hair and cloth fibers are also interesting.	Hove, E. & others *A Sourcebook For Elementary Science*
	Specific topics which individuals or small groups may wish to investigate include microscopes, telescopes, binoculars, satellites, hearing aids, stethoscopes.	Magnifying glass
	Use a styrofoam block and a small steel ball. The steel ball should be a little lighter than the styrofoam block. Have the students compare the weight of each by holding them in the palms of the hands. The steel ball will feel heavier. Check with a simple pan balance.	Microscope Styrofoam block Steel ball Pan balance
To gain experience in making organized and systematic observations.	Observing and classifying objects, or observing and identifying objects are examples of systematic observations. Children should not be forced to do regimented, scientific sorting or classifying. A more useful experience permits children to do their own sorting on the basis of their own observations. Children can observe and sort a wide variety of collections—assorted nails, buttons, leaves, marbles, seeds, sea shells, etc.	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS
	Keeping long term weather records provides a good opportunity for systematic observations.	
	Record a sequence of sounds on tape and play it back for the children to observe. Start with two or three sounds, later increase the number to five or more. Ask the children to infer what has happened. Someone could act out the sequence in order: Some samples of sequence might be: Walk to sink, turn on water, open window, close a door and sharpen pencil. Open a window, push waste basket on floor, ring a bell or play a note on a piano. Caution children to try not to lose any information as they listen. For example, it may even be possible to tell which window was opened by listening to the number of steps taken between the sink and the window.	Tape recorder
To learn about the function and care of the sense organs.	Use the Nystrom wall charts or enlarged drawings to point out and discuss the main parts of the sense organs and nervous system.	Nystrom Wall Charts "Eye, Ear, Nose and Throat" and "The Nervous System"
	Show the film, "Animals See In Many Ways." The kind of eyes an animal has, as well as the position of its eyes, are often clue to the animal's way of life.	Film "Animals See In Many Ways" (Xf-a94) Area Ten
	Put your right forefinger at arms length and the left forefinger about a foot from your nose. Look with the left eye, keeping the right eye closed. Then change eyes. Notice the difference in position of the fingers.	*The First Book of the Human Senses,* Liberty Publishing Co., Wilson, *The Human Body*
	The importance of two eyes in depth perception can be shown by trying to make the points of two pencils meet holding them at arms length with one eye closed.	Perry, *Our Wonderful Eyes* Zim, *What's Inside Me?*

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS
	Put two pennies on a table top and then lower the eyes to a level with the table top. Close one eye and move the coins until you think each is exactly as far from you as the other. Open the other eye to see if you were right. The importance of vision to the other senses can be demonstrated by putting one foot behind the other knee and trying to balance with the eyes closed. Repeat with the eyes open. Have the children observe the action of their own iris by covering one eye and looking in a mirror with the other. When the hand is removed from the covered eye, it is possible to watch the pupil become smaller. The purpose of two ears can be shown by blindfolding a student and clicking two rocks or hard objects together at different locations around his head. He should be able to detect where the sounds come form. Spread compass points apart and touch a student's neck lightly several times with one or two points. Vary the distance the points are separated and see if he can tell if one or two points are used. Repeat on other parts of the body such as the finger tips. Blindfold a student and have him hold out his bare arm. Touch him suddenly with an ice cube. The quick movement is a reflex action. Relate to a blinking of the eyes or jerking the hand from a hot object. One way to demonstrate reaction time is to arrange the class in a circle, holding hands. At a given signal, pass a hand squeeze from child to child as rapidly as possible. Note the time it takes to get back to the starting point. Individual reaction time can be demonstrated by having one child with the thumb and finger spread to try to catch an object (such as a ruler) that is suddenly dropped through his hand by another student.	Cosgrove, *Wonders of Your Senses* Reidman, *The World Through Your Senses*

JUNIOR HIGH LEVEL





ANIMALS

Instruction at this level should be highly functional. Information gained should re-emphasize objectives stressed at earlier levels and be extended into areas which effect life situations. As an example, classification is needed only for purposes of distinguishing which animals and insects may be harmful and should be controlled from those which are helpful and warrant conservation. Practices of insect control and animal conservation should be guided.

A listing of specific material to be presented during the teaching of units on animals should contain suggestions similar to the following: *Insects: Harmful and Helpful, Animals Used by Man and Animals for Pleasure.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- Animal structure for specific purpose of survival.
- The fact than man is dependent on plants for his food, received indirectly through food producing animals.
- The fact that animals may be social.
- The fact that animals may change from birth to maturity.
- Varied kinds of reproduction in animals.

To develop ability in relation to:

- Recognition of animals which are used for food, clothing, etc.
- Recognition of animals which may be directly or indirectly, harmful to man.
- Procedures for eliminating harmful animals and insects.
- Major differences among mammals, birds, reptiles, amphibians, fish and insects.

- Man's responsibility to an animal taken as a pet or aid.
- Functional vocabulary related to animals.

To develop positive attitudes on the part of the students which reflect:

- Interest in the importance of animals to man.
- An appreciation of the practice of conservation.

Activities

Initiatory:

Bulletin board displays.

Newspaper accounts of animals used by man or harmful to man.

Observation of migrating or hibernating animals.

Unit on foods to stimulate interest in source of meats.

Assimilating:

Field trips to a meat market, farm, tannery, and riding stable.

Speakers such as an animal trainer, exterminator or farmer (one who raises animals for food).

Bulletin boards:

1. Illustrations of meats and animal which is source of it.
2. Classification charts (functional) of animals and insects.
3. Pictures of property damage caused by animals and insects.
4. Illustrations of animals which do work for man.
5. Illustrations of insects and animals which may bear disease.

Related individual and group activities.

1. Oral reports on caring for pets or animals used for work.
2. Experience chart accounts of field trips, classification information, points of insect control, etc.
3. Seatwork related to identifying meat and animal source, harmful insects, use of insecticides safety and effectiveness) and other functional learning.

4. Display of materials which some from animal sources.

5. Make posters for wildlife conservation.

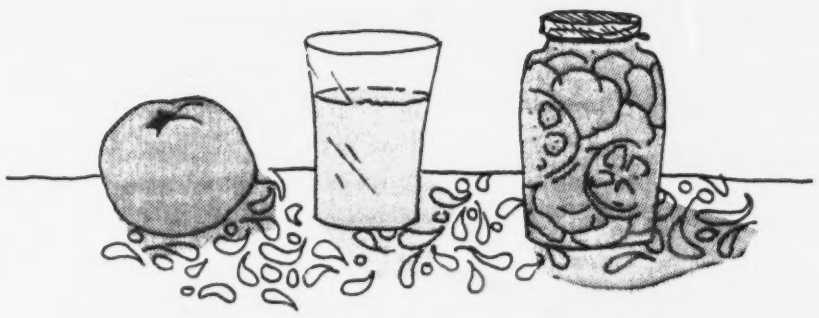
6. Experiments with animal reproduction (i.e., chick embryo or fish).

7. Discuss hobbies and leisure time activities in which animals by be included (hunting, fishing, bird watching, aquarium, raising rabbits or chickens).

Culminating:

Review experience charts.

Prepare "TV Program" telling how an animal is raised for use as food—from birth to the dinner table. Have commercials advertising why a certain brand of meat is good.



PLANTS

Instruction related to plants should be provided within a specific functional basis. Knowledge of plants which may be used by man and skill in this use are the ultimate goals for learning acquired at this level.

A listing of specific material to be presented during the teaching of units on plants should contain suggestions similar to the following: *How a Plant Gets Food and Stores Food, Plant Reproduction, Plants as Food for Man, Plants Used for Clothing, Plants Used for Shelter, Plants for Decoration and Plants for Preservation of Land and Soil.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- Seasonal effects upon plant life.
- The effect of bacteria upon foods.
- The fact that some plants make their own food and others do not.
- Classification of plants according to structure.
- Recognition of plants used in clothing.

To develop ability in relation to:

- Providing conditions and care necessary for healthy plant life.
- Identifying plants according to food value.
- Functional vocabulary related to plant life.
- Preparing plant life for use as food and shelter.
- Raising and arranging plants for decoration.
- Preservation of food.
- Practices of conservation related to plant life.

To develop positive attitudes on the part of students which reflect:

- An awareness of the importance of plant care to the survival of man.
- Intention of practicing conservation habits related to plants.
- Desire to utilize plant life most effectively.

Activities

Initiatory:

Use unit on foods to stimulate interest in plant life and growth.

Display posters for plant conservation, uses of plants, gardening, floral arrangements, etc.

Have interesting plants and floral displays within classroom.

Serve edible raw vegetables to class.

Assimilating:

Field trips to gardens, market, greenhouse, cannery, refrigeration plant and farm.

Speakers such as homemaking teacher, conservationist, food producer, lumber industry representative and florist.

Bulletin boards:

1. Illustrations of plant structure.
2. Posters on how man uses plants.
3. Illustrated steps and methods of food preservation.
4. Conservation posters.
5. Floral arrangement descriptions.
6. Pictures of plants (in original state) and processes of changing the form for clothing materials.
7. Illustrations of uses of trees.

Related individual and group activities.

1. Discuss possible projects involving plant life (i.e., flower or vegetable gardens, unit on preserving food.
2. Make experience charts on procedures of growing plants.

3. Make notebook of experience chart information.

4. Grow plants, experimenting with use of fertilizer, different types of soil, amount of water, sunlight and air.

5. Use instruction guides and teacher assistance in making floral arrangements.

6. Experiment with bread to learn how mold forms.

7. Experiment with refrigeration of food and non-refrigeration of food. Include written observations in notebook.

8. Dramatize a story which depicts man's use of plants.

9. Use seatwork activities to learn food value of plants.

10. Experiment with different methods of plant reproduction.

11. Prepare a raw vegetable for eating, noting sanitation practices and parts of plant which are not edible.

Culminating:

Raise class garden (include vegetables and flowers).

Have display of floral arrangements.

Sample Experiments

Objective:

To learn that planting seeds is not the only way to get new plants.

Experiment:

Plant a sweet potato in a jar of water. The resulting vine is often used for decoration. Explain that sweet potatoes are enlarged roots which have stored up food. You can also cut some plants and put the stems in water. They will root and then you have a new plant. Try this with pussy willows, philodendron or begonia. Some plants can be grown from leaves. African violets can be started this way.

Objective:

To stress need for cleanliness in handling food.

Experiment:

Provide two glass jars which have been sterilized and have covers which may be screwed on very tightly and two unpeeled potatoes. Allow two students to peel the potatoes—one student should thoroughly wash his hands before peeling his potato and sealing it tightly into the jar. This jar is labeled, "Washed Hands." The second student does not wash his hands before peeling and labels his jar (in which the potato is tightly sealed) "Unwashed Hands." The jars are set aside for class to observe which jar has mold form in it.

WEATHER AND SEASONS

At the junior high level, students should gain further insight into the causes of weather. This should be used for the purpose of increased skill in adapting to and anticipating changes effecting them. They should have sound concepts of basic changes occurring with the different seasons. The distinction between weather and climate should be made clear to them.

A listing of specific material to be presented during the teaching of units on weather and seasons should contain suggestions similar to the following: *Weather and Climate, Clouds, Air, Wind, Water, Seasons.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- The factors responsible for weather.
- The different types of climate.
- Terms publicly associated with weather and seasons.
- Some technical instruments used to register effects of weather.
- The water cycle.

To develop ability in relation to:

- Recognition of different types of clouds and the weather implications.
- Specific causes for and characteristics of the four seasons.
- Identity of occupations which are seasonal.
- Functional vocabulary related to weather and seasons.
- Distinguishing between weather and climate.
- Identity of various types of precipitation.

To develop positive attitudes on the part of students which reflect:

- Appreciation of cause and effect as demonstrated by weather.
- Use of weather information.

Activities

Initiatory:

Daily comparison of weather predictions to actual weather conditions.

Discussion of weather project such as a weather station.

Assimilating:

Field trips to a weather bureau and on exploratory walks to observe and discuss indications and effects of weather.

Speakers such as weather analyst or science specialist.

Bulletin boards:

1. Illustrations of the water cycle.
2. Illustrations of a home-made weather station.
3. Illustrations of wind movement and effect on various objects.
4. Uses of wind (i.e., spreading seeds, drying clothes, moving a boat and kite, windmill).
5. Movement of earth around sun.
6. Types of clouds and weather they indicate.

Related individual and group activities.

1. List seasonal jobs which may be obtained by students (i.e., cleaning sidewalks, raking leaves, mowing lawns, planting seeds and bulbs).
2. Discuss technical terms used in television weather reporting.
3. Draw illustrations of types of clouds and indications.
4. Draw illustrations of forms of precipitation and write in explanation (i.e., rain; clouds give up their moisture, dew; moisture in the air forms on cooler surfaces, snow; rain that crystallizes before hitting the ground, frost; moisture in the air which freezes on objects).
5. Check indoor and outdoor thermometers for comparison of temperatures.
6. Make weather instruments to observe outside classroom.

7. Discuss daily which routine activities might be effected or prompted by current weather conditions.

8. Discuss smog, its causes (smoke, pollen, dirt) and effects (poor plant growth, unpleasant irritation to eyes and lungs).

9. List different climates and effects in varied areas of our country.

10. Keep large chart of weather conditions for a month. Compare and present a "television" socio-drama of a summary comparison.

11. Use experience chart to record comments of daily effect upon class members by existing weather conditions.

12. Use seatwork lessons to indicate understanding of weather and seasons.

Culminating:

Review experience charts for summary and for evidence of new habits from learning.

Sample Experiments

Objective:

To show illustration of water cycle.

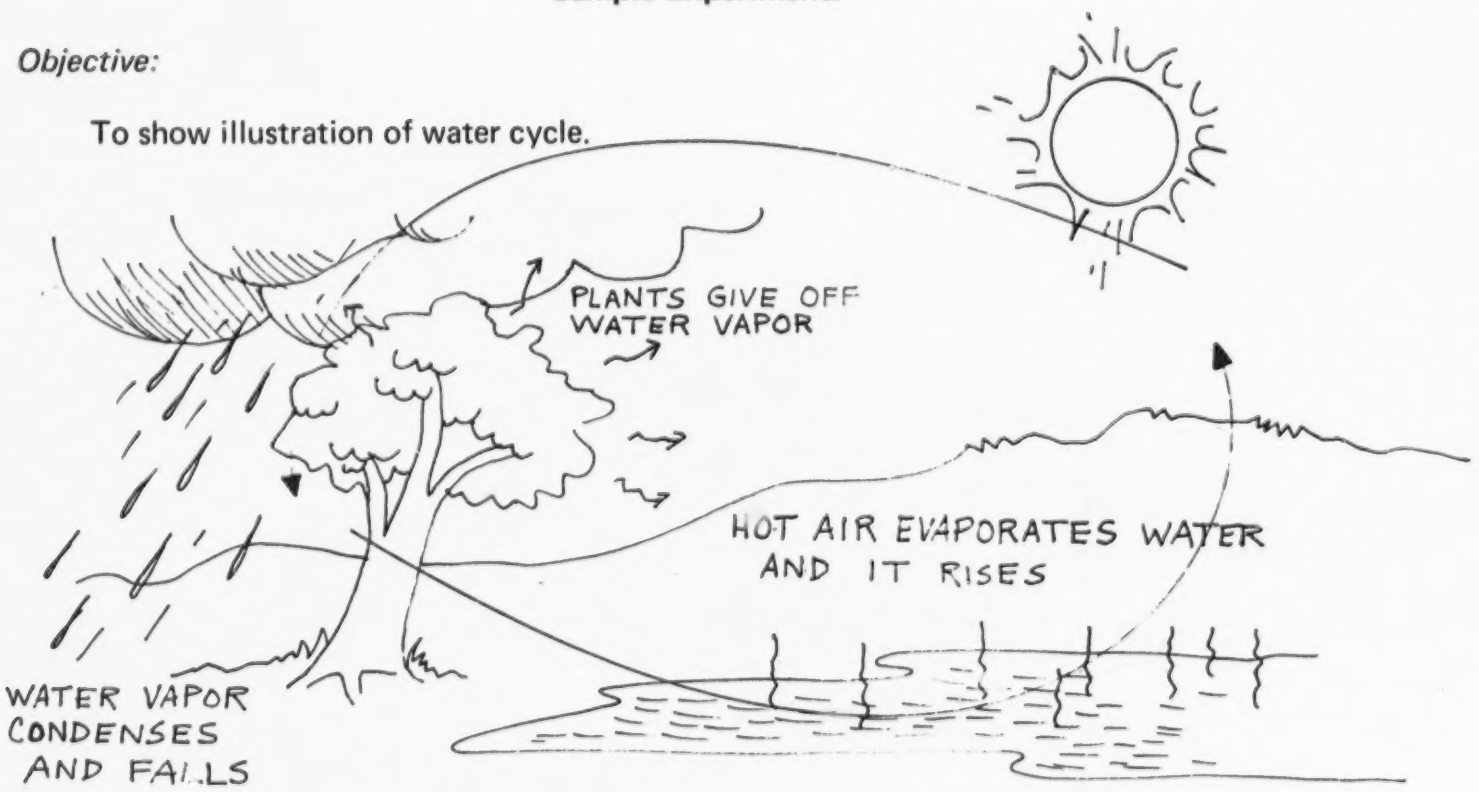


Illustration:

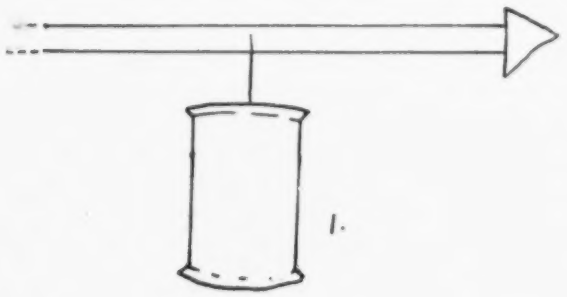
(above) Precipitation in the form of rain, sleet, hail or snow is caused by the water cycle. The sun evaporates the water on the earth's surface and the vapor is carried up into the atmosphere by rising hot air until it comes in contact with cold air masses. The warm, moist air cooling causes the water vapor to condense.

Weather Instruments for Students to Make

1. Make a wind vane by putting a long pin through a spool. Set a soda straw on the pin so that it can turn freely. Glue a paper arrow to the straw.

2. Make an anemometer. Staple the handles of some paper cups to a paper plate. Set the plate on a pin on the end of a stick so that it can turn freely.

3. Make a barometer. Fasten a piece of balloon over the top of a bottle with a rubber band. One end of a straw should be fastened, parallel to the ground, to the balloon with a drop of rubber cement. A pin should be fastened to the other end. Changes in pressure on the rubber can be seen and measured by a chart.



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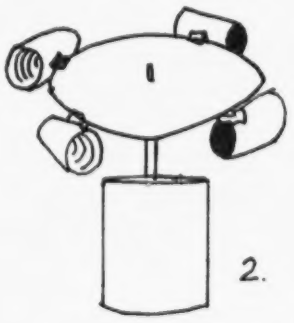

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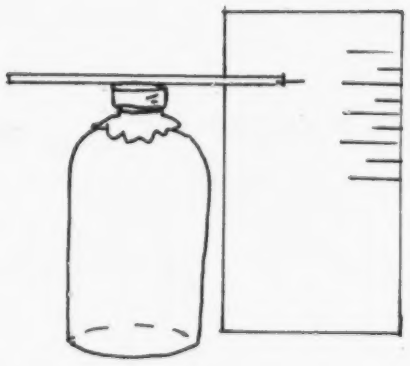

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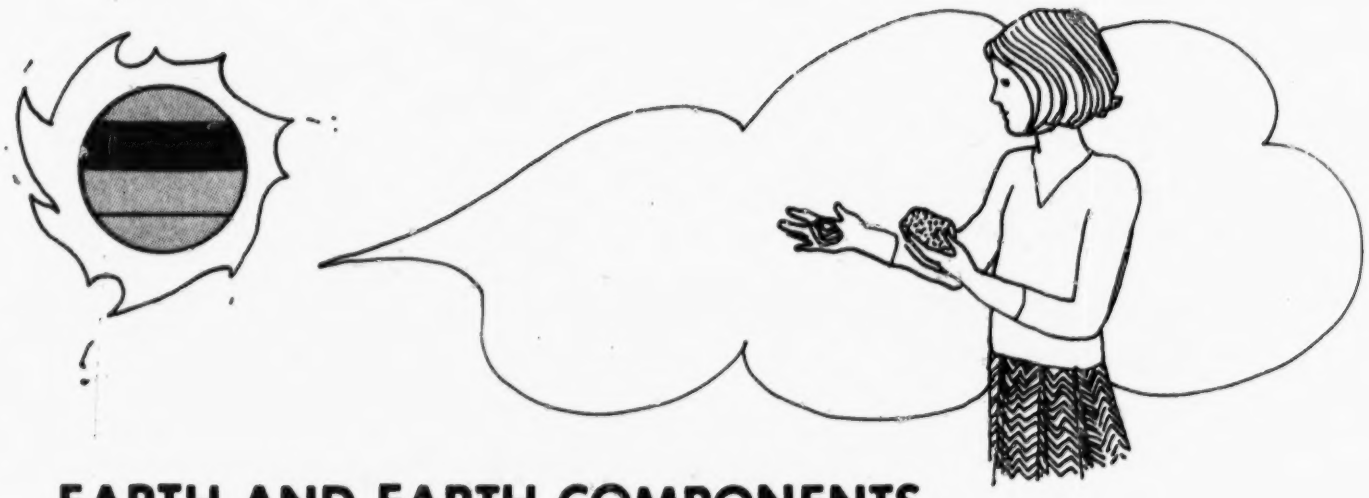


EARTH AND EARTH COMPONENTS

A retarded student should acquire sufficient factual information related to the earth and earth components to provide him with a basic understanding of his environment. Recognition of buildings, water from faucets, statues of marble, and roads made of concrete or asphalt, as examples of man's use of natural resources, help attain such a goal. Science learning should provide explanations of natural and man-made products which occur as integral parts of the physical environment. The retarded individual will benefit from such learning by being better able to relate successfully within an environment which he accepts and understands. One of the purposes of this area of study is to replace the fear, mystery and awe, which often complicate the teaching of science to the retardate, with well-founded knowledge.

A listing of specific material to be presented during the teaching of units on the earth and earth components should contain suggestions similar to the following: *Kinds of Rocks and Their Uses, Common Minerals, Common Metals, Gems, Uses of Soil, Soil Conservation and Water Conservation.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- The shape and comparative size of the earth.
- Existence of a variety of natural resources valuable to man.
- Visual and functional differences in common minerals (i.e., gold jewelry, copper wire, etc.).

To develop ability in relation to:

- Recognition of uses of rock by man.
- Functional vocabulary related to the earth and earth components.
- Practices of soil and water conservation.
- Recognition of sources of water.

To develop positive attitudes on the part of students which reflect:

- An appreciation of man's use of natural resource.
- Practices of conservation integrated into life activities.

Activities

Initiatory:

Display of rock collection.

Discussion of land changes, effects of weather or man's disruption of earth surfaces.

Display of different soils and pictures of erosion, well-tilled soil, etc.

Assimilating:

Field trips to rock quarry, construction site, water works, and exploratory walks for observation of stagnant water, erosion, rock layers, effect of plants upon soil.

Speakers such as conservation officer and geologist.

Bulletin boards:

1. Pictures of varied rock types and formations.
2. Illustrations of man's uses of soil, rock and water.

Related individual and group activities.

1. Use experience charts to record observations and learnings.
2. Seatwork to reinforce functional learning.
3. Sensory experiences with rocks and soil for differentiation of consistency, form and texture.
4. Experiments with rocks and soil to show effects of water, plants, action of man, etc.
5. Discussions, demonstrations, and reading to identify metals, gems and common minerals.
6. Display of rocks to be classified by students.
7. Use of magnifying glass and available science equipment to examine properties of rock, soil and water.
8. Practice various methods of ventilating a room.

9. Construct a frieze on harmful and helpful effects of water.

10. Develop bulletin board display on construction materials from natural resources.

11. Write letters to conservation services for printed information.

Culminating:

Prepare and dramatize a program presenting conservation practices which should be a part of daily life.

Sample Experiments

Objective:

To show that air exerts pressure.

Experiment:

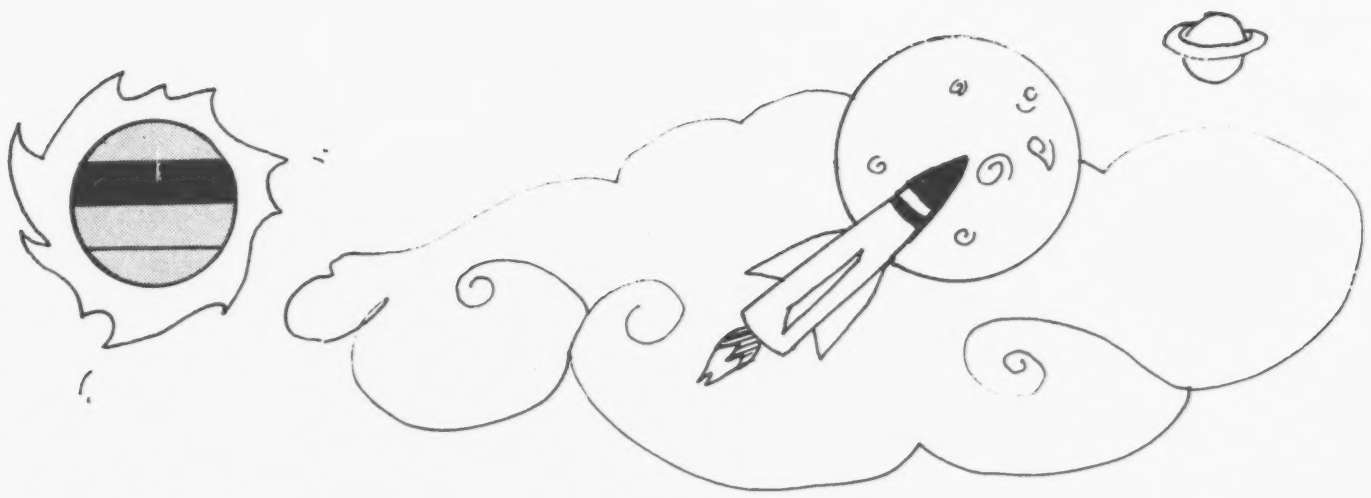
Acquire an empty can of one-gallon size with a screw-on cap and pour in a cup of water. Place over burner and bring to a boil for several minutes. The steam will force air out of the can. Remove from the flame and screw on the cap quickly. Let the can cool and watch it cave in. As the steam inside cooled and condensed, there was nothing to exert an outward pressure and the can was crushed by the pressure of the outside air.

Objective:

To show that there is air in the soil.

Experiment:

Put some soil or sand in a beaker. Cover it with water and then watch the bubbles rise.



THE UNIVERSE

The continuing goals of developing awareness and learning from observation should accompany instruction at this level. Familiarity with the solar system as it relates to current space programs will allow students some understanding of news items. Review of information presented at the intermediate level will probably be beneficial.

A listing of specific material to be presented during the teaching of units on the universe should contain suggestions similar to the following: *Causes for Days and Years, Our Space Program and How the Sun Helps Man.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- Space exploration as important to man.
- The objectives cited for Intermediate Level.

To develop ability in relation to:

- Using observation for development of questions and simple research.
- Functional vocabulary related to the universe and space exploration.
- Recognizing that man uses heat and energy from the sun.
- Explanation of the effects of the rotation of the earth.
- Recognition of some reasons for space exploration.

To develop positive attitudes on the part of students which reflect:

- Appreciation for man's use of the sun.
- Interest in space efforts which may benefit mankind.

Activities

Initiatory:

Pictures of space flights and programs in progress.

Illustrations of uses of the sun for heat and energy.

Incident of eclipse to motivate interest.

Assimilating:

Field trips such as exploratory walks to observe stars visable in early morning sky, and evening observations if possible.

Speakers such as a person with particular knowledge of space program or science specialist.

Bulletin boards:

1. Magazine and newspaper items and pictures related to space.
2. Pictures from the Apollo expedition showing moon surfaces, the earth from space, etc.
3. Representations of solar system.
4. Illustrations of uses of the sun.

Related individual and group activities.

1. Experiments showing rotation of earth, sun and moon.
2. Review of pertinent activities from intermediate level.
3. Experience chart accounts of studies.
4. Class reports on rockets and satellites.
5. Experiments with heat from the sun.

Culminating:

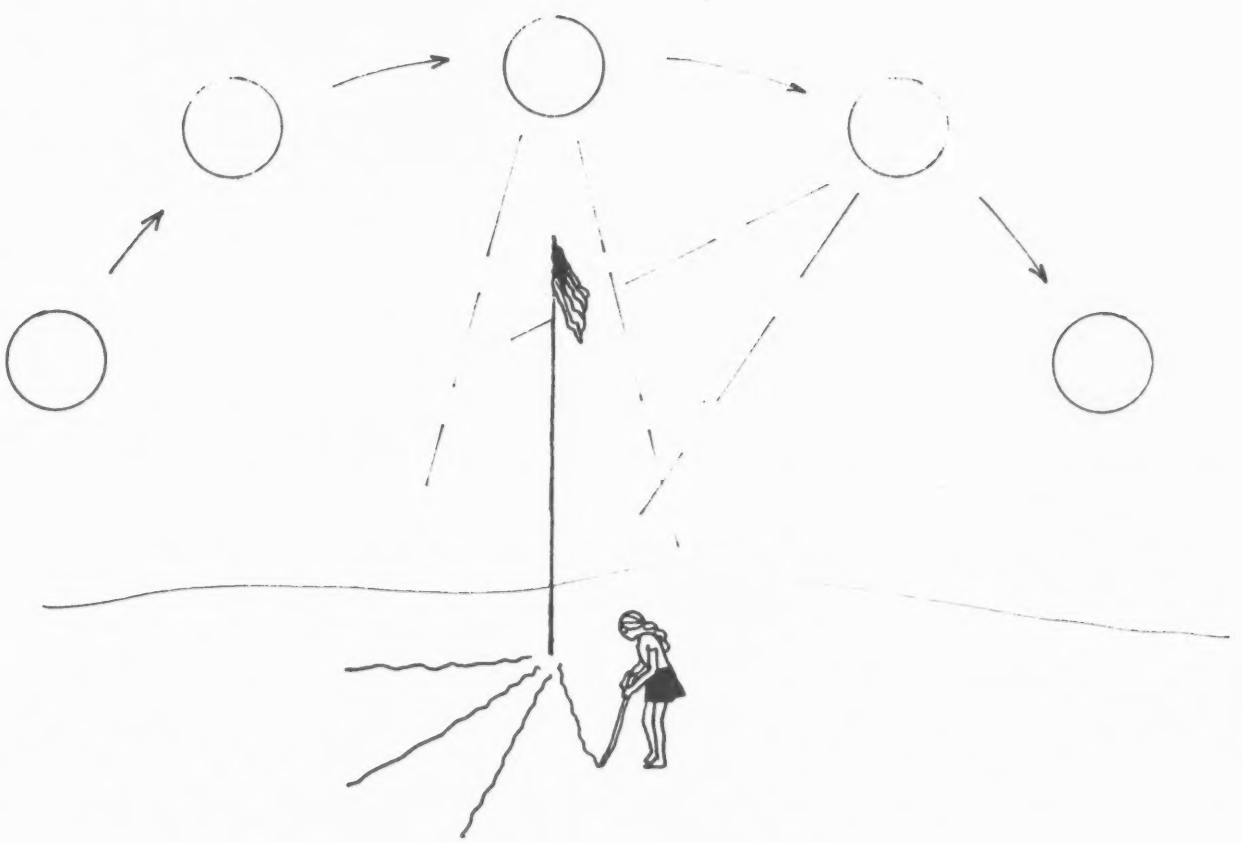
Review experience charts.

Dramatize space flight with suggestions of what might be found if one landed on another planet.

Sample Experiment

Objective:

To show the apparent motion of the sun in the sky.



Experiment:

Before the class begins in the morning and every 1/2 hour during the school day have a student mark on the ground the position of the flagpole shadow. (See illustration above). When the last mark is made have the whole class observe as you line up the marks on the ground with the top of the flagpole and they will be able to determine the path of the sun in the sky. Point out that this is the "apparent" motion of the sun.

FORCES

The topics covered in this section of the suggested science activities are related primarily to actual life experiences. The degree of comprehension experienced by students will affect the ease with which they face many physical tasks. The teaching of skills in the use of tools and machines which require a basic understanding of forces is the overall goal of this area.

A listing of specific material to be presented during the teaching of units on forces should contain suggestions similar to the following: *How Man Learned to Use and Control Fire, Electromagnets, Simple to Complex Machines, How Sound Travels and Fuels Which Power Machines.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- The fact that sound waves may travel through solids, liquids and gases.
- The fact that fuel, oxygen and heat are needed for burning to take place.
- The fact that many forms of energy can be changed into electrical energy.
- The fact that gravity is a force which pulls objects towards the earth.
- The definition and effect of automation.

To develop ability in relation to:

- The stated objectives of the Intermediate Section.
- Using the voice effectively as an instrument of sound.
- Recognition of examples of force, work and energy.
- Recognition of substances which burn and release energy.
- Recognition of principle and use of: an electromagnet, a dry cell battery, air pressure, a ramp, pulleys, levers, wedges and the wheel.

- Recognition of uses for electrical energy.
- Methods of care for equipment.
- Recognition of fuels used to power machinery.
- Recognition of common tools and uses for them.
- Using mechanical devices found in public places (i.e., pay telephone, elevator, vending machines, etc.).

To develop positive attitudes on the part of students which reflect:

- An appreciation of knowledge of sources of energy.
- An appreciation of the importance of wise use of energy.
- Practice of safety with use of forces and energy.

Activities

Initiatory:

Display of examples of machines such as lever, pulley, wedges, etc.

Fire Prevention Week preparation.

Assimilating:

Field trips to an electrical generating plant, machine shop, public self-service elevator, location of vending machines, public telephone booth, etc.

Speakers such as an electrician, a machinist, fire chief, etc.

Bulletin boards:

1. Comparative illustrations of automation and manual labor.
2. Illustrations showing sound traveling through varied solids, liquids, and gases.
3. Illustrations of complex machines based upon simple machines with which class is familiar.
4. Posters on safety with fire, electricity and machines with which the class is familiar.
5. Illustrated steps for proper care of tools and equipment.
6. Illustrated steps to aid in learning to use and follow directions.

Related group and individual activities.

1. Experience chart record of functional rules, directions and related learning.
2. Seatwork for reinforcement and evaluation of related learning.
3. Experiences with tuning fork, telephone and other sound devices.
4. Demonstrate the use of magnets in daily life (can openers, knife racks, tack hammers, etc.).
5. Read and discuss stories about how man learned to use and control heat.
6. Demonstrate the inclined plane and list ways in which it is used.
7. Demonstrate the principle of the level and fulcrum as it relates to moving objects from a low level to a higher level.
8. Demonstrate how a simple engine works.
9. Use experiment of pouring vinegar over a mixture of baking soda and water to show chemical change. Relate this to examples such as bread-baking and extinguishing fires.
10. Use tarnished pennies for comparison of soaking in soap and water with soaking in salt and vinegar. Use this example to show how certain common household cleaners work more effectively than others for certain purposes.
11. Make an electromagnet and display familiar items which use the principle of an electromagnet for power (i.e., doorbells, chimes, motors and switches).
12. Show how electricity is changed to light by attaching the terminals of a dry cell battery to a flashlight bulb.
13. Discuss the force of gravity, using examples of dropping objects (familiarity with current space programs may allow use of examples of "floating in space" beyond the pull of gravity).
14. Practice care of equipment with oiling parts, tightening screws, bolts, nails, etc.
15. Practice efficient use and care of simple machines.

Culminating:

Present socio-drama illustrating frequent uses of simple machines, use of tools for care of the equipment, and care of tools and machinery.

Review experience charts and compile a booklet of tips on use of forces.

Sample Experiments

Objective:

To experience sound traveling through solids.

Experiment:

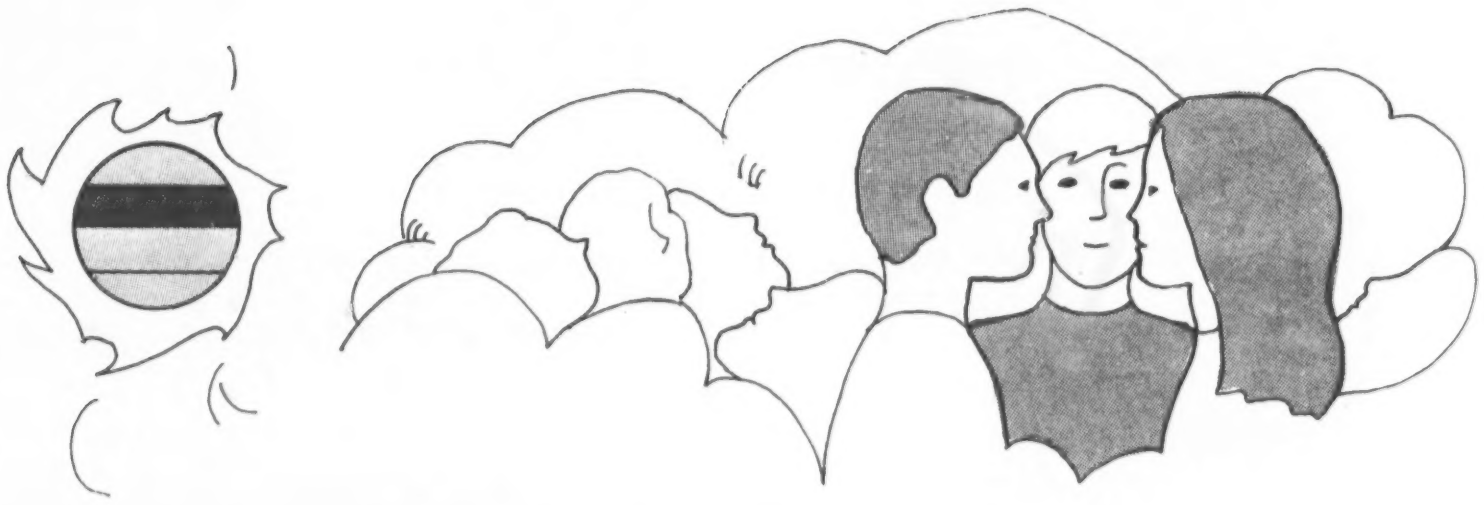
While one student places his ear against one end of a table, another taps lightly on the other end with a pencil. (This is the method Indians used when placing their ear to the ground to hear approaching horsemen.)

Objective:

To show that sound travels through liquids.

Experiment:

Strike a tuning fork against a hard surface. Immerse it into the surface of water. The sound waves are evidenced by the ripples in the water.



HUMAN BEINGS

The goals of studying the human should be twofold. Students should first acquire general knowledge of the body systems sufficient to aid them in caring for their bodies and recognizing symptoms of illness and disease. Because it is assumed that some such teaching will be covered in health areas, the content coverage is somewhat limited in this section. The second goal of this area of study is that developing ability in adapting to environmental change and awareness of the interdependencies among living things.

A listing of specific material to be presented during the teaching of units on the human should contain suggestions similar to the following: *The Digestive Systems, The Respiratory System, The Circulatory System, The Nervous System, The Skeletal System, The Reproductive System, Body Needs: Air, Water, Food, Protection and How Man May Change His Environment to Meet His Needs.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- The fact that the digestive system makes food ready to be used by the body.
- The fact that the skeletal system supports the body.
- The fact that the circulatory system carries blood from the heart to all parts of the body.
- The fact that the heart pumps blood to all parts of the body.
- The fact that the respiratory system supplies the blood with oxygen and rids it of carbon dioxide.
- The fact that the brain keeps the parts of the body working together.
- The fact that the reproductive system enables man to reproduce life in his own form.
- The fact that man, through the ages, has improved his methods of changing environment to meet his needs.

To develop ability in relation to:

- Using good posture habits for better general body function.
- Recognizing proper habits of nutrition and elimination as necessary for good health.
- Providing fresh air and good breathing procedures for better functioning of the respiratory system.
- Recognition of signs of illness or disease.
- Using the mind for solution of problems presented within the environment (i.e., such problems as heat, cold, rain, thirst, hunger, pain).

To develop positive attitudes on the part of students which reflect:

- An appreciation of reasons for good health practices.
- An acceptance of man's ability to adjust to environmental changes and to change the environment to meet his needs.
- An appreciation of the structure of the human body and the stamina provided to man by its functioning.

Activities

Initiatory:

Posters and models displaying body systems.

Class discussion of illness or health problems.

Pictures of prehistoric living conditions improved by man.

Assimilating:

Field trips to construction sites or health displays.

Speakers such as school nurse, dentist, and archaeologist.

Bulletin boards:

1. Posters of body systems.
2. Charts on care of teeth, skin, and exercises.
3. Illustrations showing man's adjustment to environmental conditions.
4. Illustrations of man's ability to change environment to meet his needs.
5. Charts representing signs of illness or disease.

Related group and individual activities.

1. Experience chart recordings of learning.

2. Seatwork for reinforcement and re-emphasis of learning.

3. Practice of good posture habits, with model demonstrations of effect upon body organs.

4. Construction of booklet with rules for good health, emergency procedures for body safety and signs of illness or malfunction of body parts.

5. Discussion of the effectiveness of man's environmental adjustments (i.e., a cave and a modern house).

6. Socio-drama in which student is asked to act out solution of problem requiring adjustment to or change of environment.

7. Read texts and make reports on body systems and the important care required for maintenance.

8. Consider man's basic needs and how they are met.

Culminating:

Make survival kits for use in case of dire weather conditions, situations in which person is stranded away from conveniences, or in case of nuclear attack.

Keep individual health charts and record any progress noted from habits acquired during class study.

THE ENVIRONMENT

At this level the student should learn to explore the concept of interdependence. Using their own community as the focus for this study, they will become aware that they play an important part in its ecological structure. Emphasis on the contributions they make to the community will help engender a sense of responsibility and improved self-image.

Most of the material in this unit can be presented in the form of problems. This method will give the students the opportunity to apply and revise the concepts that they have learned from other units.

A listing of specific material to be presented during the teaching of units on environment should contain suggestions similar to the following: *Interdependence, Controlled Environment, Pollution and Soil Erosion.*

General Objectives

To develop, through observation and participation, the ability to respond in basic social conversation to:

- The significance of interdependence within an environment.
- The concept of controlled environment.
- The current problems man faces in the preservation of his environment.

To develop ability in relation to:

- Recognition of how man controls his environment.
- Recognition that, as man has increased his technology, so has he increased his interdependence.
- Recognition of the conflicting views on land use priorities.

To develop positive attitudes on the part of the students which reflect:

- Awareness of the need to utilize environment wisely.

- Awareness of the problems concerning pollution and how they are being solved in the local community.
- Awareness of the fact that these problems concern everyone, not only conservation officers and government officials.

Initiatory:

Collection and discussion of newspaper articles that are concerned with conservation and pollution.

Introduction of the term "pollution" and its meaning.

Field trips to show pollution and conservation in the local community (i.e., to a factory, a river that has industrial outlets, a farm, etc.).

Introduction of the term "soil erosion" and its meaning.

Assimilating:

Speakers such as a state official who is concerned with conservation planning, a landscape gardener, a scientist to talk on space as an environment, etc.

Stories of people adjusting to an alien environment (i.e., space, deep sea divers, mountain climbers).

Visit a "hot house" as an example of a controlled environment.

Bulletin boards:

1. Pictures of flowers and vegetables growing in their natural environment and a controlled environment.
2. Pictures of primitive man cooking food contrasted with food being cooked in a modern kitchen.
3. Pictures of areas of land that have been damaged by natural disasters (i.e., floods, fire, insect pests, etc.).
4. Pictures of current pollution problems (i.e., oil slicks, dead fish from industrial outlets, automobile junkyards, etc.).

Related group and individual activities.

1. Have the children discuss what changes would result if a part of their environment was eliminated (i.e., absence of birds, if all the trees were cut down, if all the butchers went on strike, etc.).
2. List all the people that are involved in getting a food product to the table (i.e., Corn. . . seed distributor, farmer, farm laborers, insecticide producers, transportation of corn to processing plants, processing employees, packaging plant employees, sales personnel, etc.).
3. Discuss how early man acquired his housing and contrast this with the complexity of the modern building industry.

4. Experiments on balanced environments.

5. Revise experiments on the effect of water on soil and rock.

6. Discuss the ways the environment is controlled in the classroom (i.e., heating, lighting, air conditioning, etc.).

7. Have the students compare the moon and earth as environments suitable to man. List the changes that would be necessary on the moon to make it habitable.

8. List the ways in which man uses controlled environments (i.e., for physical comfort, for producing better varieties of plants, etc.).

9. Distinguish between various types of pollution (i.e., air, water, noise, etc.).

10. Discuss the importance of planning the use of available land. This may be used to lead into an understanding of the conflicting views on land use priorities.

Culminating:

At the end of the school day, collect all the garbage in the classroom and use this to initiate a discussion into the problems of garbage disposal.

Study the methods of garbage disposal in the local community.

Sample Experiments

Objective:

To show the effects of an overload of waste matter in the water.

Experiment:

Remove the fish from an aquarium and put in a quantity of assorted garbage. Observe the changes over a period of two or three days.

Objective:

To illustrate the importance of a balanced environment.

Experiment

Remove the snails from an aquarium. Observe the formation of algae. Replace the snails and note the results.

Suggested Resource Materials
Junior High Level

Asimov, I., *A B C's of space.* New York: Walker and Co., 1969.

Banks, M. A., *How foods are preserved.* Chicago: Benefic Press, 1963.

Barr, J., *What will the weather be?* Toronto: George J. Mcleod, Ltd., 1965.

Benedick, J., *Space travel.* New York: Franklin Watts, Inc., 1969.

Friskey, M., *The true book of air around us.* Chicago: Childrens Press, 1953.

Knight, D. C., *Let's find out about insects.* New York: Franklin Watts, Inc., 1967.

Pine, L. S., *Friction all around us.* New York: McGraw-Hill Book Co., Inc., 1960.

Podendorf, I., *Magnets and electricity.* Chicago: Childrens Press, 1961.

Podendorf, I., *The true book of weather experiments.* Chicago: Childrens Press, 1961.

Shapp, M and C., *Let's find out about the man.* New York: Franklin Watts, Inc., 1965.

Uhl, M. J., *About some animals that work for us.* Chicago: Melmont Publishers, 1963.

Zim, H. S., *What's inside the earth?* New York: William Morrow & Co., 1953.

Filmstrips
Order from: Eye Gate House, Inc.; 146-01 Archer Avenue; Jamaica, New York 11400.

Series: *Science in Everyday Life*

43B	Air and Life
43C	Soil and Its Uses
43D	The Sounds We Hear
43E	Sight in Our Daily Lives

Series: *Fundamentals of Science Grades 3-4*

119B	Weather Maps and Weather Forecasting
119D	Living Things Need Food
119E	The How and Why of Keeping Food
119I	Messages Travel and Are Recorded

Series: *The Space Age*

131B	Exploration of Space
131E	The Conquest of Space
131F	Man Travels in Space

Teaching Transparencies
Order from: The Instructo Corporation; Paoli, Pennsylvania 19301.

Series: *The Universe* 810-A

810-1 The Solar System
810-2 Relative Sizes of Planets
810-3 Revolution
810-12 Eclipses of the Sun & Moon

Series: *Plants* 817-A

817-1 Parts of a Plant
817-2 Parts of a Flower
817-3 From Flowers to Fruit
817-5 Mold & Fungus Plants

Series: *Magnetism & Electricity* 824-B

824-1 Fields of Force
824-2 Dry Cell & Circuit
824-3 Electric Bell

STARTER UNIT

JUNIOR HIGH LEVEL

WEATHER

This unit was originally written by Emogene Mangold
for a course in Curriculum Development for the
Mentally Retarded at the University of Iowa.

THE WEATHER

Rationale

This unit was selected on weather as it offers an opportunity for the children to better understand the variable weather conditions of their state. The children should know how to dress on chilly days, very cold days, hot days, as well as when it rains or snows.

They need to know how the weather can affect their leisure time, vacation plans, and work plans.

This unit would be started in the middle of February and extended through the month of March. March was chosen as it is the most variable of months. We usually have at least one snow storm in that month as well as rain, sleet, sunshine, winds and sometimes even thunder storms.

If the children understand more readily what causes the different weather conditions, they will be less apt to fear extreme weather changes. They will learn safety precautions they can take.

The scope and flexibility of the topic should allow transfer to other units at the appropriate time.

Sub-Units

Seasons	Vocations	Leisure time
Measurement	Clothing	Safety
Health	Communication	Vacation time

General Objectives

To recognize that air is all around us, can move, and has no color.

To recognize that air takes up space.

To recognize that air carries seeds.

To be able to identify that many things are in the air.

To identify specific characteristics of the different seasons.

To recognize the natural elements of wind, thunder and rain and their effects upon living things and upon the earth.

Core Area Activities

Arithmetic Concepts

Use a calendar to show the dates for keeping track of weather conditions.

Measure precipitation: rain, snow.

Read a thermometer, inside and outside, under different weather conditions.

Learn dates, by months, day and year.

Keep a weather calendar.

Keep a weather chart.

Social Competencies

Discover how we can use air for fun: ballons, whistles, kites, blowing bubbles and sail boats.

Visit farmers and other outdoor workers to learn how the weather affects their work.

Discover the ways weather helps us play in the different seasons.

Find all the signs of spring and list them, or display.

Plan an ideal vacation.

Plan a trip to the weather station.

Learn to follow directions, whether oral or written.

Communicative Skills

Keep a daily weather chart.

Make a bulletin board showing all the signs of spring.

Keep daily experience charts. Write them in class.

Read daily experience charts.

Read daily weather reports from the newspaper.

Make weather booklets.

Visit the U.S. Weather Station and relate the experience.

Write thank you note for the opportunity to visit the weather station.

Listen to stories and records concerning different weather.

View films concerning weather and discuss. Use experience chart in connection with the films.

Listen to resource people about their jobs in relation to the weather.

Compose a story that features a weather change such as a wind storm, flood or blizzard.

Illustrate the above story.

Illustrate the different weather conditions creatively.

Learn functional vocabulary.

Health

Demonstrate the types of clothing to be worn for a specific weather condition.

Exhibit the different play equipment that will be used depending on weather conditions.

Plan and serve a good winter lunch.

Plan, make and serve a good hot-weather meal.

Make charts showing proper food for all seasons.

Make a check list on good health rules pertaining to a particular season, as well as in general.

Safety

Make posters showing winter safety, and include ice, snow, and severe storms, such as blizzards.

Make a winter safety booklet.

Make a spring and summer safety booklet that includes storms, water safety, vacation safety tips, and heat wave tips.

Have a tornado drill in school and discuss what procedure would be followed in the home.

Vocational Skills

Observe how the weather conditions effect most outside workers such as farmers, visit with them.

Develop big muscles through dramatizing activities such as shoveling walks, skating, jumping, marching, and swimming.

Play kick ball to develop big muscles.

Take an observance walk to find signs of spring.

Discover and discuss how extra money can be earned through seasonal odd jobs such as shoveling walks, mowing lawns, digging dandelions, washing cars and washing windows and putting on screens.

Resource Material

filmstrips

films

daily experience charts

bulletin boards

field trip to weather station

plastic

tempera & water colors

chart paper

seasonal pictures

drawing paper

newspapers

newsprint

shelf paper

felt tip pens

chalk

paint brushes

scissors

magazines and catalogues

paste or glue

walks to discover weather changes

tape recorder

poem books

crayons

radio

music book

glass jars

glass tubing

cork

ice cubes

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
To recognize that air is all around us, has no color, and can move.	Tell the children that air is all around them all the time. Have a plastic bag blown up to show them that air does not have color and that air does not have shape. Illustrate how air moves by waving a large piece of cardboard and by using an electric fan. A large feather is used with the fan. Write experience chart. Read orally. Seatwork: Have the children make pinwheels, then experiment with these (use draftiest parts of room); placing them in front of an open window, in front of the fan, and on the children's desks.	A blown-up plastic bag. Large sheet of cardboard. An electric fan. Chart paper 6" x 6" construction paper. Straight pins 8" long wooden dowel pins.	Display a picture of wind blowing the trees. This is mounted on construction paper. Air Air is around us. Air can move. Air has no color. Air is real.
To recognize that air takes up space.	Show film. Blow up a balloon explaining how we can put air into things. Use 2 bottles in an aquarium to illustrate how air takes up space. Experience chart: review, write one for today, read orally. Seatwork: duplicate experience chart story. Give one to each child. Worksheet No. I: Where is Air?	"How Air Helps Us" COR 11 min. Balloon 2 empty bottles Aquarium Chart paper Ditto master copy Worksheet No. I.	Air can move things. We can see what happens when air moves. We can see what air does when it moves. Air is useful. Picture of seeds. The wind blows the seeds to new places. The seeds will grow into plants. The wind helps us.
To recognize that air carries seeds.	Show film "Blow, Wind, Blow" Experience chart: review. Write experience chart. Read orally. Duplicate and give to children. Seatwork: have them illustrate "Seeds," Worksheet No. 2.	"Blow Wind, Blow" Cornet 11 min. Chart paper Drawing paper Ditto master copy Crayons	

OBJECTIVE	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
To be able to identify that many things are in the air.	Show pictures and explain them. Filmstrip: "What Is Wind?" Experience chart: review; write; read orally; duplicate. Seatwork: "What Do We Find in the Air?" Worksheet No. 3.	Pictures of seeds, insects, birds, kites, airplanes, clouds, ballons. "What Is Wind?" Jan Handy film Chart paper Duplicating paper Worksheet No. 3.	We see birds in the air. We can play with balloons and kites in the air. Airplanes and helicopters fly in the air. Birds and insects fly in the air.
To identify characteristics of the different seasons.	Show different pictures of the weather, the four distinct seasons. Tell story. Write experience chart after review. Read orally. Duplicate. Seatwork: illustrate duplicated sheets, use pictures of the seasons from magazines.	Magazine pictures of the four seasons. *When Will the World Be Mine?* Schlein: Walsch, 1950. Duplicating paper Chart paper Drawing paper Paste Scissors	Place the four seasonal pictures at the top of the chart. Air can be full of rain or snow. In winter it is cold. It may snow in the winter. In the spring it is warmer and may rain. Summertime is a time for outdoor fun. It is warm in the summer. Sometimes it is very hot. In the fall many animals store food for the winter.
Winter	Show pictures of snow. If it has snowed, measure it. Filmstrip. Experience chart: review; write; read orally. Seatwork: draw a snow scene on dark construction paper with white chalk.	Pictures of snow drifts and fenceposts. Filmstrip "The Seasons" EB Duplicating paper Chart paper Dark construction paper White chalk	On chart display a snow scene. December, January, and February are winter months. It is usually cold during these months. Snow can be pretty. Do you like snow?

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
Play	Show pictures of skiing, ice skating, snowmen and sliding.	Pictures of winter fun.	Picture of winter sports on experience chart.
	Read book: *White Snow, Bright Snow.*	*White Snow, Bright Snow,* Teresselt: Lathrop, 1958.	We can have fun in the snow.
	Experience chart: review; write; read orally.	Chart paper	We can skate. We can ski. We can play with our sleds.
	Seatwork: have the children copy experience for their notebooks.		
Ice	Do an experiment with freezing water.	Two galss jars, thermometer.	We like to play in the snow.
	Film: "Children In Winter"	Film "Children In Winter" Cornet.	Water changes form when it freezes.
	Experience chart: review; write; read orally.	Chart paper	Pictures of winter sports on experience charts.
	Seatwork: as a group construct a winter mural. Make several life-size action figures by having a child lie on a large sheet of paper and draw around him.	Large sheet of newsprint Child-sized sheets of shelf paper or newsprint. Pencils, tempera or crayons Paint brushes Cotton, paste	We can have fun in the snow. We can skate. We can sled.
Work	Show pictures of people working.	Pictures of people working.	Pictures of people working in the winter.
	Read: *Katy and the Big Snow*	*Katy and the Big Snow* Burton: Houghton & Co.	In the winter we can work.
	Experience chart: review; read orally.	Chart paper	We can shovel walks.
	Seatwork: finish group project of the winter mural.	Snow mural, paper, cotton, paste, tempera paint, and plastic wrap for ice. Paint brush.	We can work in the snow. We can play in the snow.
Safety	Show a picture of falling on ice.	Picture of dangerous ice.	Picture of a child falling on the ice.
	Do an experiment with ice and salt.	Ice, salt	Be careful when you walk on the ice.
	Film: "Safety In Winter"	Film: "Safety In Winter" Cornet	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
	Experience chart: review; write; read; and duplicate	Chart paper Duplicating paper Magazines, scissors Paste, paint and brushes.	Do not push people when they are walking on the ice. Do not laugh if someone falls on the ice. Spread salt on the ice for safety.
	Seatwork: illustrate the experience chart story with pictures from magazines or original, whichever the child desires.		
Proper clothing	Show pictures.	Pictures showing winter and summer clothing.	
	Discuss which is the proper clothing to wear in the winter.		Picture of a warmly dressed child.
	"Today is March _, the first Monday in March. We shall keep a weather chart for March." Explain the different symbols.	Individual weather charts.	Clothing keeps us warm.
	Read: *Too Many Mittens*	*Too Many Mittens*, Slobodkin: Vanguard Press	
	Exchange chart: review, read, make.	Chart paper	It keeps out the cold air and holds in the body heat.
	Seatwork: select winter clothing from catalogues.	Catalogues Scissors, paste Drawing paper	We need caps and mittens when it is cold.

If there is time, all winter scrapbooks should be assembled and a cover made. A review of all the air and winter experience charts could be made, thus "wrapping" up this portion of the unit.

As we wish to illustrate the spring lessons that would normally come later in the month of March, we shall skip the units on temperature, where we will make a simple thermometer, keep a week's chart of daily temperature both in and outdoors. After the temperature we shall study different clouds.

The simple thermometer is made by placing a cup of water into a glass jar, adding a cork cap through which a glass tube is inserted. The jar is placed into a larger container and hot water is added to the second container. The water moves up the tube as the jar becomes warmer. The children will see how the thermometer works. They will also learn to read thermometers. They will make individual temperature charts and keep those for a week at a time to illustrate the variations of temperature in March.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
Spring	Play a tape of "Spring Is Here." Learn and sing.	"Spring Is Here" *Music Around the Clock* Tape recorder	Spring picture
	Filmstrip: "Spring Is Here."	Film: "Spring Is Here." SVE.	Spring is nearly here.
	Hand out newspaper weather reports and/or the children take turns reading these. One child is to bring a report each day.	Newspapers	In the spring the grass grows.
	Distribute to the class duplicated words of the song for learning, as well as for saving for a spring scrapbook.	Duplicate words for the song.	Flowers grow in the spring.
	Start a large bulletin board of "Signs of Spring" for the children to assemble. They are to add to it each day as they see new signs of spring. At the start only bare trees are used, later the children will add buds and leaves of crepe paper.	Brown crepe paper Black chalk Green matting	Soon the birds will be here.
	Experience chart: review, write, and read orally.	Spring picture for experience chart.	The first bird that comes will be a robin.
Wind	Play the song, "Spring Song" on tape recorder.	"Spring Is Here" *Music Around the Clock*	Pictures of kites in the air.
	Show pictures of windy weather. Also show and discuss different kites.	Pictures of kites and windy weather.	We like to play with kites in the wind.
	Filmstrip: "What Is Wind?"	"What Is Wind?" JH	
	Experience chart: write and read after reviewing.	Chart paper	
	Worksheet: construct kites. Large ones for windows, small for bulletin boards.	Construction paper Paints and brushes Scissors, paste Crayons, string	
	Show pictures of windmills, clothes drying and gliders.	Pictures of windmills, clothes drying and gliders.	Pictures of wash drying outside, mounted on construction paper.
	Read: *Peter's Long Walk.*	*Peter's Long Walk* Kingman: Doubleday, 1953.	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
	Discuss taking a walk the first nice day, to find signs of spring.		The wind blows and blows.
	Add wind, clothes line, clothes pins and clothes to the bulletin board.	Two tinker toy skicks. 12" string Picture of wind Paper clothes cut from magazines.	Some days it blows very hard. Some days it doesn't blow at all.
	Seatwork: duplicate an illustration of a bare tree. Have the students draw the leaves being blown by the wind.		In March we have many windy days.
Thunder and rain.	Show pictures of rain and thunder storms. Record: "Rainy Day," "What Is Thunder?"	Pictures: thunder storms, rain. "Rainy Day," "What Is Thunder?" Educational Records.	Picture of a stormy spring day. I like the sound of rain.
	Make umbrellas. Add to bulletin board. Experience chart: review, write, read orally.	Plastic for umbrellas. Toothpicks Chart paper	Rain helps the grass to grow.
	Seatwork: with watercolors make outdoor pictures illustrating rain.	Drawing paper Watercolors, brush	Rain helps the flowers to grow. When rain washes the soil away it is called erosion.

The children's bulletin board should be completed. The children should make simple rain gauges from pill bottles and take these home. The summer unit could include planning vacations, water safety, healthful foods and comfortable clothing. A garden could be started to show how weather helps growing things. In the fall a unit much on the order of this could be easily made incorporating safety, health and leisure time ideas as well as the other core areas.

In the spring unit several lessons would be devoted to storms to help the child understand them and to control his fear. By understanding what to do during a storm, the child may have less anxiety.

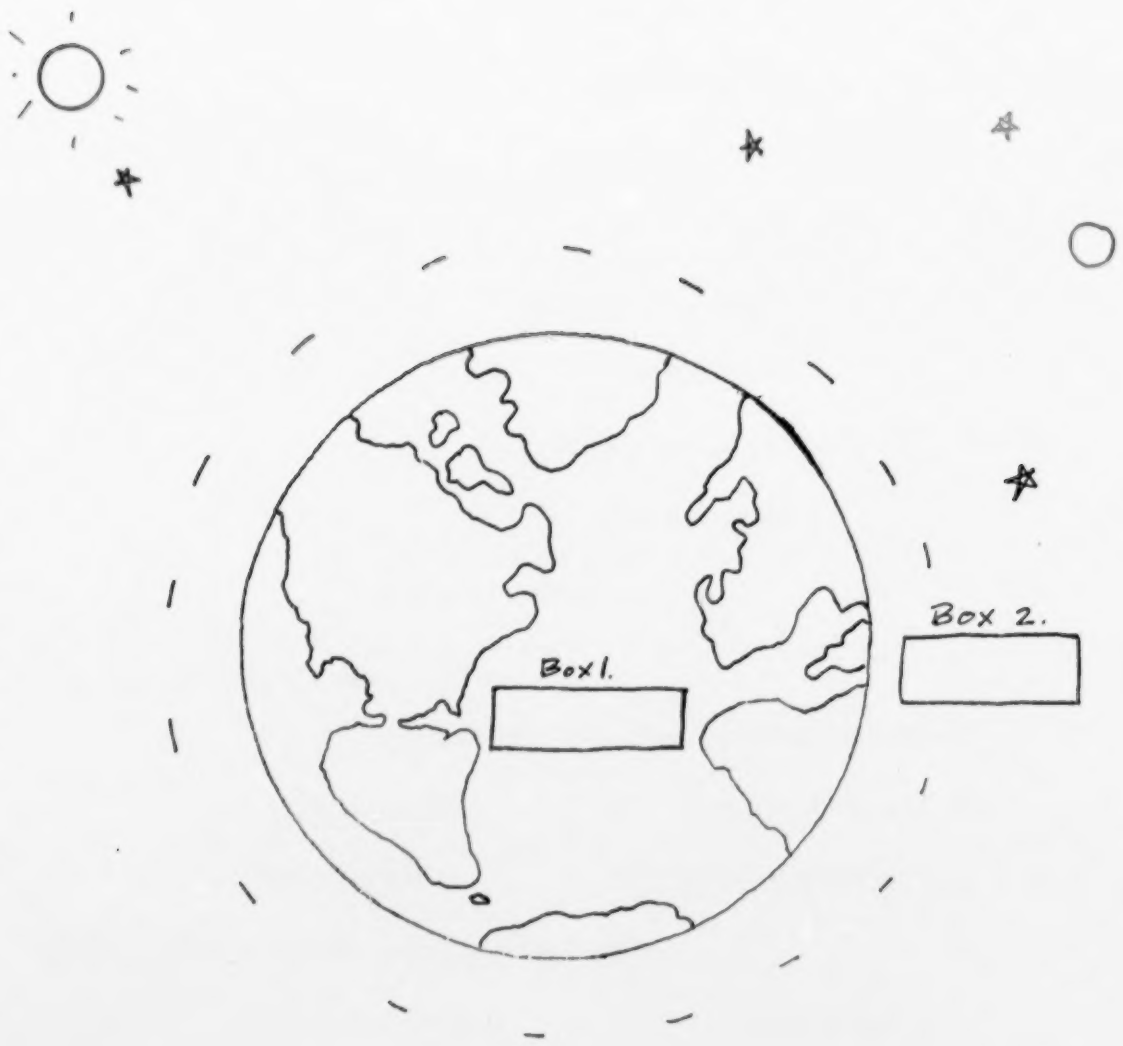
From this unit could be developed a unit on gardens, a health unit emphazing good, wholesome foods, or one on manners.

Worksheet No. 1

Write *Earth* in Box 1.
Write *Air* in Box 2.

Do you know where space is?
It is beyond air.

Draw a space ship somewhere in space.



Worksheet No. 2

SEEDS

In a milkweed pod,

Snug and warm,

Seeds are hiding,

Safe from harm.

Open wide the pod,

Hold it high,

Come, strong Wind,

Help them fly.

Author unknown

Finish the sentences with the right word.

1. The seeds are in a _____ . (Chair, pod)

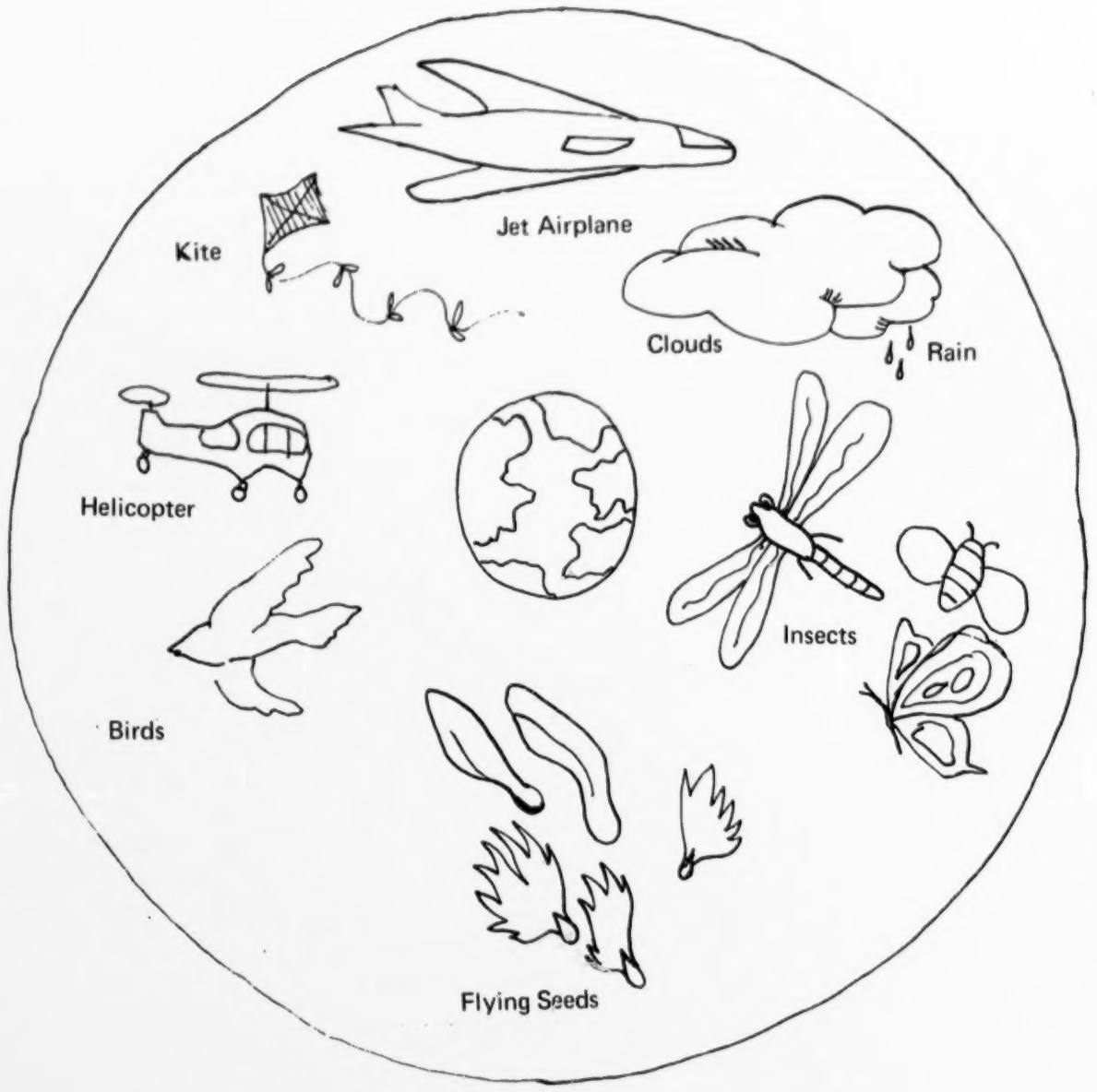
2. The seeds are snug and _____ . (Cold, warm)

3. _____ , helps them fly away. (The sun, strong wind)

4. It helps them _____ . (Swim, fly)

Worksheet No. 3

WHAT DO WE FIND IN THE AIR?



Color, count items.

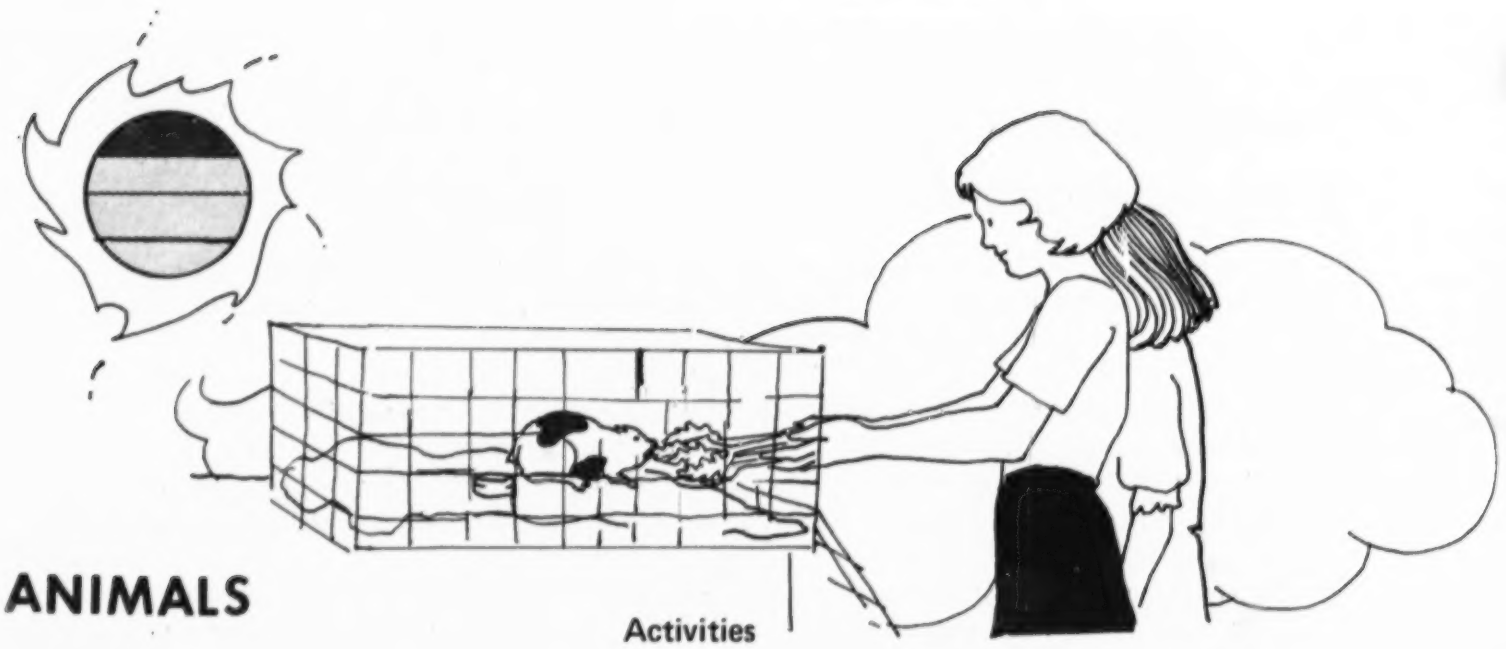
How many? Add other things.

SENIOR HIGH LEVEL

SENIOR HIGH

Comparatively few new science concepts will be introduced at the senior high level. Most of the teacher's efforts at this level will focus on the provision of functional experiences which allow the student to apply the knowledge he has previously acquired. There will, of course, be some senior high students who are not proficient in the concepts taught in the science curriculum at the lower levels. While the specific number of such students cannot be anticipated, their needs for review and remedial work must be considered when planning the science program at the secondary level. In general, the science experience at this level should be oriented toward a functional application of the concepts previously learned.

Rather than presenting the science activities as separate lessons at the secondary level, the teacher should endeavor to incorporate the materials in his teaching of practical skills in such areas as occupations, homemaking, home repairs, and safety. With this in mind the suggested experiences at the secondary level will be geared to functional activities. As is characteristic of the previous levels, the suggested content and activities are not inclusive, instead they are intended to provide direction to the teacher in the development of his own program.



ANIMALS

Activities

Initiatory:

Discuss man's need for and use of animals.

Review objectives of previous levels in animal study to reinforce learning and plan for any areas needing further study for establishment of basic, general knowledge.

Read about adults whose jobs are related to animal life (i.e., farmers, veterinarians, cattlemen, hunters, trappers, exterminators, butchers, etc.).

Assimilating:

Field trips to a butcher's shop, grocery, veterinarian clinic, farm, ranch, stockyard, pest or insect control center.

Speakers such as kennel owner, butcher, wildlife conservationist, exterminator, veterinarian.

Bulletin board:

1. Conservation posters.
2. Meat identification charts (naming parts of a beef, etc.).
3. Illustrations of kinds of insecticides.
4. Illustrations of animals which may be raised for profit.
5. Rules for choosing pets for young children.
6. Hints for freezing meats.
7. Rules for protecting animals against disease.

Related group and individual activities.

1. Choosing samples of animals which may be bred and raised for profit (i.e., domestic rabbits, chickens, mink, hamsters, gerbits). Raise these in classroom, with budget accounts of expenditures, records

of feeding, growth, loss, etc. Establish method of finding a market for the product and what a fair price would be. Students should compare direct advertising through newspapers to that of selling to pet shops or markets. Relate this to larger scale livestock raising.

2. Learn conservation and safety practices related to animal life. Hunting and fishing may be presented as relatively inexpensive recreational activities. Discuss safety rules, equipment, and varied methods most successful with different types of animals.

3. Practice cleaning (dressing) game and fowl. Compare costs of buying meat which has been completely processed to that which is cleaned and cut up in the home (i.e., fowl, halves of beef, etc.). Consult with butcher on methods of preserving meats, how long meat will remain safe for eating without refrigeration, where meats should be frozen and when re-freezing is possible.

4. Practice pest control through experiments with varied insecticides. Select areas known to have termites, roaches, ants, beetles, flies, mosquitos or whatever insect pests may be located. Have students "treat" areas to decide whether they may control through commercially purchased methods.

5. Provide a unit study on the procedure of selecting pets for small children. Consider cost involved in purchase and care of pet, pleasure derived from actual experience with pet, amount of care required and safety of exposure to pet.

6. Visit pet hospital to observe signs of illness and treatment of animals. Discuss diseases which may be transmitted by animal to man. Make class reports on care needed to prevent disease in animals.

7. Discuss possible vocations in which learning related to animal life may be utilized (i.e., poultry farm helper, farm hand, mink ranch helper, kennel man, kitchen worker, meat processing employee, animal hospital clean-up person, turkey farmer, taxidermy, beehives, etc.).

PLANTS

Activities

Initiatory:

Discuss varied uses for plant life.

Review objectives of previous levels in plant study to reinforce learning and plan for any areas needing further study for establishment of basic, general knowledge.

Read about vocations in which a knowledge of plant life would be valuable (i.e., landscape gardener, golf course keeper, florist's helper, sod layer, farm hand, vegetable or flower salesman, farmer, forest ranger, etc.).

Assimilating:

Field trips to a nursery or greenhouse, florist's shop, vegetable market, farm or vegetable garden.

Speakers such as produce manager, home economist or florist (on floral arrangements), farmer, etc.

Bulletin boards:

1. Wide variety of floral and plant arrangements.
2. Food plant classification according to nutritional value.
3. Illustrations of conservation practices related to plant life.
4. Pictures of persons involved in work related to plant life.

Related group and individual activities.

1. Study seed packets to learn procedures and times for planting according to instruction.
2. Plant experimental seeds, selecting "good" and "poor" according to size and appearance. Compare resultant plant growth.

3. Have class instruction in floral and plant arrangements. Use fresh and dried flowers, green (non-flowering) plants for experimentation and class display.

4. Study and plant vegetables which may be grown locally. Choose a variety for provision of good nutritional value (for home garden use).

5. Wash and prepare fresh vegetables for cooking. Compare nutritional value of raw and cooked vegetables.

6. Plan and prepare a well balanced menu.

7. Acquire area for class care of a lawn. Practice mowing grass, trimming around sidewalks, weeding, trimming hedges, etc. Discuss any erosion problems which may be found and how to overcome such; also cover for shaded, bare spots. Discuss care of mower and other lawn equipment - learn and practice safety habits with this equipment.

8. Discuss grains which are grown by farmers which provide food for man and which provide food for animals. Point up that a good grain crop for feeding animals may determine some of the quality of meat going to market.

9. Discuss conservation practices which students may practice while camping, visiting parks, or by improving own property.

WEATHER AND SEASONS

Activities

Initiatory:

Interest and discussion of weather conditions.

Review objectives of previous levels in study of weather and seasons to reinforce learning and plan for any areas needing further study for establishment of basic, general knowledge.

Discuss jobs which are affected by weather, either because they are done outside or are seasonal in nature (i.e., construction, farming, gardening, road building, maintenance, professional sports, etc.).

Assimilating:

Field trip to a weather station.

Speaker such as weather analyst.

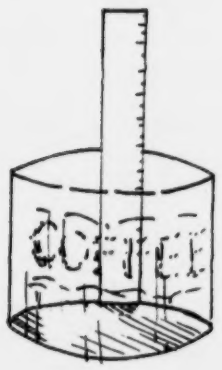
Bulletin board:

1. Weather reports from newspaper.
2. Illustrations of weather instruments.
3. Magazine and newspaper illustrations and accounts of effects of weather.
4. Illustrations of seasonal jobs.

Related group and individual activities.

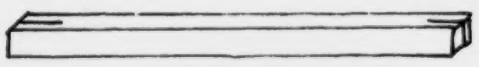
1. Construct weather instruments according to the following instructions: keep daily weather charts, making predictions, act as a "weather man" providing written daily reports for other special education classes.

RAIN GAUGE

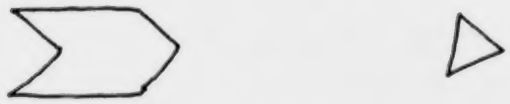


Attach plastic ruter to side of can using waterproof glue. End of ruler must rest on bottom of can.

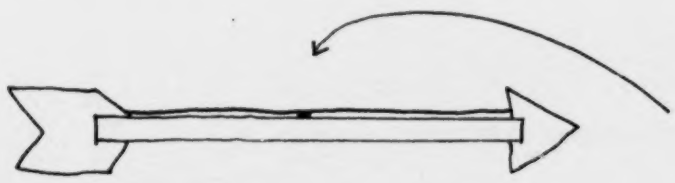
WEATHER VANE



1" x 1" wood piece
12" to 18" long
Split at each end



Arrowhead and tail cut from plastic.



Hole drilled through arrow at center of balance.

Finishing nail driven in support.

Rub support with candle to lubricate where arrow rubs.

EARTH AND UNIVERSE

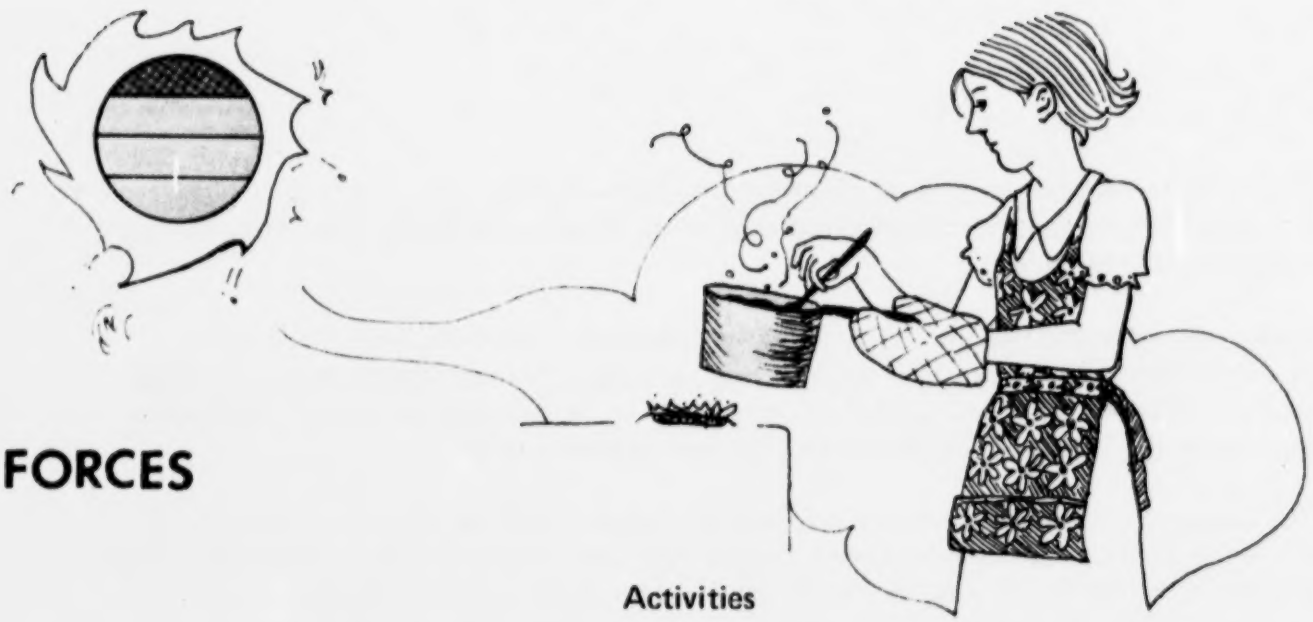
Activities

Ability in these areas of study is more related to the objective which is stated: to develop, through observation and participation, the ability to respond in basic social conversation to. . . The emphasis at the senior high level will occur more through deliberate use of incidental teaching than through planned activities. The objectives stated for previous levels will be reinforced and included in various core area activities. The teacher should be aware, at all times, of these previously listed objectives in order to do this effectively.

Use of the news, radio, and television media for correlation of specific objectives with current events is highly recommended. Evidences of earth changes, main effect of changes in earth surfaces, use of natural resources are significant news items which may frequently be available.

Television programs and films presenting specific geographic phenomena and also those stressing practical means of conservation may be used as supplementary material.

Because current space programs are fast becoming an integral part of our society, students should have maximum opportunity for exposure to the accounts of major events within them, (i.e., discussion of the problems and their solutions encountered on the Apollo 13 flight could be used to lead to a realization of the tremendous complexity of space ventures). Many classes are allowed to view television accounts of rocket launches and satellites. Special education classes should not be excluded if at all possible to provide such an experience.



FORCES

Activities

Initiatory:

Discuss what a force is and how man uses forces.

Review objectives of previous levels in the study of forces to reinforce learning and plan for any areas needing further study for establishment of basic, general knowledge.

Read stories and view film to illustrate man's use of forces.

Emphasis of importance of knowledge and efficiency in uses of forces for vocational competency and skill in position as home/manager.

Assimilating:

Field trips to electrical repair shop, machine shop, garage.

Speakers such as electrical repair man, mechanic, and household appliance salesman.

Bulletin boards:

1. Illustrations of appliances and machines commonly used.
2. Posters on regular efficient care of appliances and machines.
3. Illustrations of indications of repair needed on electrical appliances.
4. Posters on safety in use of and around machines.

Related group and individual activities.

1. Have fire extinguishers of varied types (both for home and commercial use) available for class experimentation. Teach students (if necessary have member of Fire Department instruct) to use fire extinguishers. Wherever possible, provide actual blaze to be put out. Close supervision and emphasis upon safety is mandatory. Point up that the extinguisher must be refilled after use. This is done either by a member of the Fire Department or by the dealer from whom the equipment is bought. Extend this experience to cover Fire Safety as the job of all responsible citizens. Use classroom experiences to show how to put out grease fires, smoke control, and

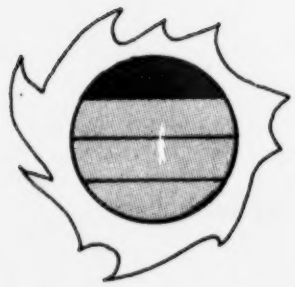
explain the existence of home fire alarm systems. Stress the fact that every family should have a fire escape plan such as schools have. Small children should be prepared as to what they shou d do in case of fire in the home.

2. Study local ordinances and rules pertaining to the disposition of leaves and trash. Find out if burning is illegal. Discuss why there are rules about burning in residential areas. Where permitted, secure an oil barrel, galvanized garbage can, or trash burner for class practice in safety habits while burning refuse. Stress instructions regarding not burning aerosol cans.

3. The cooperation of an electrical repair shop may be engaged to provide a classroom display of household electrical appliances with need of repair. Use these to illustrate indication for caution by showing frayed cords, split plugs, worn coils, etc. Guide students to differentiate between minor and major repairs. If possible, acquire appliances requiring minor repair for classroom practice. Students may learn simple repairs which will serve economic purposes as well as possible vocational aid. Replacing cords or plugs on electrical appliances is one example. Home repair manuals, shop manuals and some science texts are sources of teacher guidance for repair projects.

4. Experiences and learning related to motors, automobile care, machines such as saws, lathes, drills, etc., is appropriate for reinforcement of the objectives previously taught in the study of forces. It is anticipated that such experience may be available through school shop courses and therefore not elaborated here. If such a program is not available, these are possibilities for inclusion in the science program.

5. Further practice in use of knowledge related to electricity will provide more efficient home management and increase safety factors. Students should become familiar with fuse boxes, learn to identify a blown fuse, recognize different sizes of fuses, and know how to replace blown fuses. They should know how to locate and operate a main switch. The different wattage of light bulbs should be known, with stress on which areas within a home need more or less light.



HUMAN BEINGS

Activities

Initiatory:

Discuss interdependence of all living things.

Extensive reinforcement of objectives and activities presented for junior high level.

Discuss vocations in which a knowledge of human beings is important, (i.e., hospital worker, nurses aid, dental assistant, etc.).

Assimilating:

Field trip to local health department or clinic to view facilities and services available.

Speakers such as school nurse, social health worker, and athletic coach.

Bulletin boards:

1. Body systems charts.
2. Diagram of local health organizations and their relationship to community health.
3. Illustrations representing varied diseases affecting human beings.
4. Posters listing personal and home responsibility for community health.

Related group and individual activities.

1. Use of activities suggested for junior high level.
2. Use classroom experiments to show the effect of cigarette smoke on clothing; relate how stains are caused by nicotine. Study the reports of the effects of smoking upon the human body. List diseases such as lung cancer, cardiovascular disease, chronic bronchitis, emphysema, and peptic ulcer, which may be associated with cigarette smoking.
3. Display and identify isopropyl, methyl and ethyl alcohol. Observe biological specimens preserved in alcohol and point up hardening of tissues. Discuss why alcohol prevents decay. Pour a small amount of a distilled liquor on an egg. Observe coagulation of protein. Relate to action of

alcohol on human tissues and digestion. Discuss the immediate and continued use of alcohol and the possible effects upon the human body.

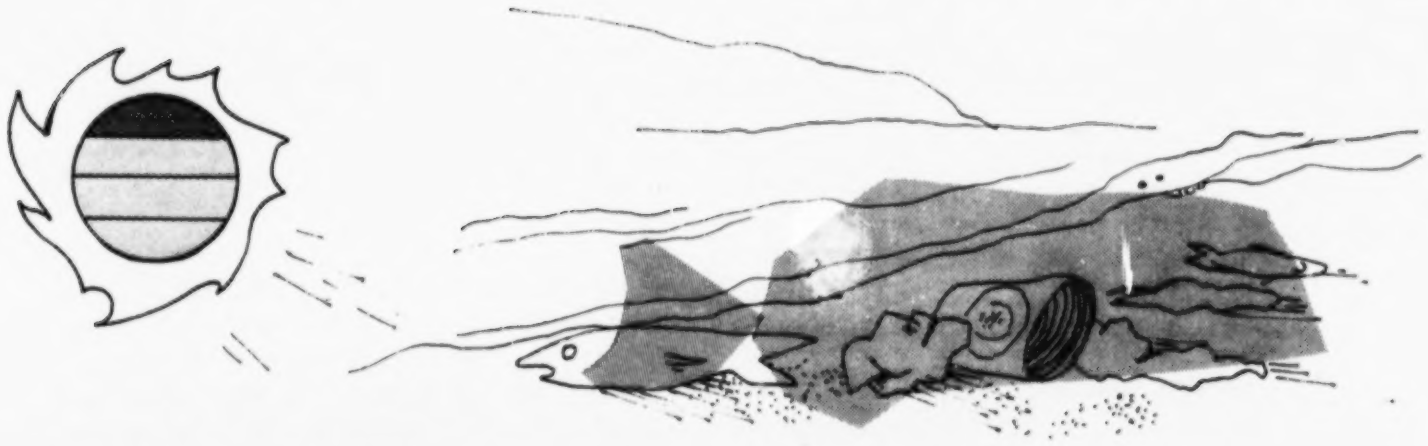
4. Display material related to the current implied increase in use of addicting drugs. Discuss effects of drugs upon the human body and how addiction occurs.

5. Discuss organic diseases as those caused by improper functioning of some part(s) of the body. Learn to recognize common symptoms which may indicate an internal disturbance. Recognize heart disease, cancer, diabetes, cirrhosis of the liver, arthritis and muscular dystrophy. Distinguish between diseases which are contagious and those which are inherited.

6. Use microscope, overhead projection of illustrations, and films to show micro-organisms. Explain that infectious diseases may be caused by such germs. Discuss venereal diseases and preventative measures for them.

7. Study the body defenses against disease. Learn ways in which an individual may help the body defenses. Review cleanliness habits which help the skin tissues build barriers against infection. Practice cleansing and using antiseptic on breaks in the skin. Learn measures for preventing illness and the importance of proper medical care.

8. Interview representatives and visit local health organizations which work for better community health. Make posters for bulletin board which indicate responsibilities involved in accomplishing good community health. Learn how community facilities may be secured if a family needs assistance with health problems.



THE ENVIRONMENT

Activities

Initiatory:

Discuss the term environment and revise its meaning.

Review and discuss the environmental concepts that have been presented at the earlier levels.

Introduce the term "ecology" relating it to the study of interdependence.

Assimilating:

Field trips to observe controlled environments (i.e., farms, a city park, etc.).

Speakers such as a conservation officer, a biologist, a town planner, a state official, and a representative from the Air Control Commission.

Bulletin boards:

1. Illustrations of pollution.
2. Illustrations of eroded land.
3. Posters listing individual responsibility for the conservation of land.
4. Posters on the health hazards of pollution.

Related group and individual activities.

1. Discuss the various types of air pollution. Present the problem of pollution caused by the automobile versus the value of its use. Discover the laws that apply in the state for the control of exhaust fumes. Explain the manufacturer's objections to the laws and point out that it also effects the consumer in high costs. Contact the local officials who are concerned with ordinances on the burning of trash. Have them discuss alternative methods of disposal with the class. Present the problem of industrial air pollution and the possibilities of control. Relate air pollution to health hazards.
2. Discuss the effects of water pollution. List diseases that can be transmitted by water (i.e., typhoid, cholera, etc.). Stress the need for boiling drinking water if the source is unknown.

3. Using the fishing industry as an example talk about the need for laws governing not only pollution, but the conservation of natural resources. Show how the needs of one industry can effect another, (i.e., the damming of rivers preventing the spawning of salmon, etc.). Apply for a fishing license and discuss the reasons for licensing control. List other recreational pursuits that require licensing, adding those that the students may consider to need controls. Discover how the licensing fees are used and discuss the ways in which the parks and recreation departments are financed (i.e., taxes, federal funds, etc.).

4. Introduce the concept of population explosion. Discuss this relating it to ecological balance. List the ways in which the population explosion contributes to the destruction of the environment (i.e., accelerated use of natural resources, the need for land for housing, etc.). Mention the health hazards, both physical and psycological of overcrowding. Suggest methods of population control (i.e., birth control, control by family planning, control by laws limiting the number in a family, etc.).

5. Study the local zoning ordinances and how they contribute to the community. Select a community type (i.e., agricultural, industrial, etc.) and plan a layout using the ordinances as guidelines.

6. Explore the possibility of assuming the responsibility for an area of land within the community (i.e., part of the school grounds or a local park). Plan improvements discussing the cost of purchases which would be needed (i.e., shrubs, trash cans, paint, etc.) and where they could acquire them (i.e., donations from local organizations, florists, etc.). Present the problem of obtaining money to maintain the area once it has been developed.

Suggested Resource Materials

Secondary Level

Blough, G. O., *Useful plants and animals.* Evanston, Illinois: Row, Peterson & Co., 1959.

Branley, F. M., *Exploring by astronaut.* New York: Thomas Y. Crowell Co., 1961.

Bova, B., *The uses of space.* New York: Holt, Rinehardt & Winston, 1965.

Feravolo, R. V., *Weather Experiments.* Champaign, Illinois: Garrard Publishing Co., 1963.

Munch, T. W., *What is a solar system?* Chicago: Benefic Press, 1959.

Smith, F. C., *The first book of water.* New York: Franklin Watts, Inc., 1959.

Sonneborn, R. A., *The question and answer book of space.* New York: Random House, 1965.

Talley, N., *To save the soil.* Washington: Dial Press, 1965.

Webber, I. E., *Thanks to trees.* New York: William R. Scott, Inc., 1942.

Zim, H. S., *Lightening and thunder.* New York: William Morrow & Co., 1952.

Filmstrips

Order from: Eye Gate House, Inc.; 146-01 Archer Avenue; Jamaica, New York 11400

Series: *Science in Everyday Life*

43A Water and its Importance
43B Air and Life
43C Soil and its Uses

Series: *The Space Age*

131B Exploration of Space
131D Aviation in the Space Age
131E The Conquest of Space
131G Hazards in Space Travel
131H Destination in Space
131I Stations on the Moon

Series: *The Interdependence of Nature*

ME 1401 The Cycle of Nature
ME 1402 The Balance of Nature
ME 1403 The Four Seasons
ME 1404 Conservation

SCIENCE

Evaluation Sheet

The SECDC development staff has the responsibility of producing documents for special education teachers that are readable, usable and relevant. The format and illustrations are meant to enhance the content. To improve the documents an on-going evaluation of them is necessary. The teacher is the logical critic and the development staff invites this evaluation.

Please fill out this form as soon as you have read the document.

Was the content meaningful and relevant?

Was the layout readable and easy to follow?

Was the information for the teacher sufficient and easy to follow?

What additional materials or information would prove beneficial for you?

Additional comments:

SECDC
IOWA